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JUN 30 2017

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Subject: Biological Opinion on the Sawtooth and Boise National Forests Invasive Species Project (Aquatic); Blaine, Boise, Butte, Camas, Cassia, Custer, Elmore, Gem, Oneida, Power, and Twin Falls Counties, Idaho and Box Elder County, Utah (01EIFW00-2017-F-0465)


Dear Ms. Mullen and Ms. Seesholtz:

This letter transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) on effects of the Sawtooth and Boise National Forests' (Forests) proposed Invasive Species Project to the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat. In a letter dated January 4, 2017, and received by the Service on January 10, 2017, the Forests requested formal consultation under section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Your letter included a biological assessment and proposed action describing effects of the subject action on bull trout and its habitat.

Through the biological assessment and proposed action, the Forests determined that the proposed project was likely to adversely affect bull trout and its designated critical habitat. In the enclosed Opinion, the Service finds that effects of the proposed management program are not likely to jeopardize the coterminous United States population of bull trout, or destroy or adversely modify designated critical habitat.

Please note that if conditions change such that the analysis in the enclosed Opinion is no longer accurate, reinitiation of formal consultation may be necessary provided the Forests retain discretionary Federal involvement or control over the action. If you have any questions regarding this Opinion, please contact Dan Nolfi of our office at (208) 237-6975 extension 110.

Sincerely,


Gregory M. Hughes
State Supervisor

Enclosure

cc: USFS, Twin Falls (Mitchell)
USFS, Twin Falls (Haney)
USFS, Boise (Roerick)
USFWS, Boise (Holder)

**BIOLOGICAL OPINION
FOR THE
SAWTOOTH AND BOISE NATIONAL FORESTS
INVASIVE SPECIES PROJECT
ADA, BLAINE, BOISE, BUTTE, CAMAS, CASSIA, CUSTER, ELMORE, GEM,
ONEIDA, POWER, TWIN FALLS, AND VALLEY COUNTIES, IDAHO AND BOX
ELDER COUNTY, UTAH**

01EIFW00-2017-F-0465



**FISH AND WILDLIFE SERVICE
IDAHO FISH AND WILDLIFE OFFICE
BOISE, IDAHO**

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Date 6/30/2017

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INTRODUCTION

This document represents the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) on the effects to the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat from the Sawtooth and Boise National Forests' (Forests) proposed Invasive Species Project (Project) within both wilderness and non-wilderness portions of the Sawtooth National Forest (NF) and non-wilderness portions of the Boise NF in Idaho and Utah. This Opinion was prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; [Act]). Your January 4, 2017, request for consultation was received by the Service on January 10, 2017.

This Opinion is primarily based on the Forests' *Fisheries Resources Biological Assessment & Biological Evaluation* including the *Proposed Action for Biological Assessment & Biological Evaluation* (USFS 2017, entire), dated January 2017, and other sources of information cited herein. The biological assessment (Assessment) and proposed action (Proposed Action) are incorporated by reference in this Opinion.

Consultation History

Both Forests covered under this action have previously consulted on noxious and invasive plant treatments. The proposed actions for both Forests covered ground-based activities involved with noxious weed management including ground-based herbicide application, manual controls, biological treatments, and rehabilitation. The Boise NF completed a biological assessment for noxious and invasive weed management covering the South Fork Salmon River subbasin in September 2009. The Service's biological opinion dated November 1, 2009, covers this action through the end of 2017. The Sawtooth NF completed a biological assessment for noxious and invasive weed management covering the Fairfield and Ketchum Ranger Districts, and the Sawtooth National Recreation Area in April 2012. The Service's biological opinion dated November 29, 2012, covers this action through October 2022. However, those consultations no longer meet the current and expected needs of the Forests due to wider spread threats and expected increase in fire frequency.

Involvement of the Forests, the Service, and National Marine Fisheries Service (NMFS) on this project to date includes 1) collaboration on a draft proposed action; 2) conference calls to discuss the proposed action and ESA determinations; and 3) review of multiple draft BAs before obtaining Level I Team consensus. A chronology of this consultation is presented below. A complete decision record for this consultation is on file at the Service's Eastern Idaho Field Office in Chubbuck, Idaho.

July 2015	The Forests present and discuss their proposed Project at a Level 1 meeting.
December 2015	The Forests begin informal discussion of their Projects at a Level 1 meeting.
June 2016	The Service receives a draft Assessment for the subject action.

July - December 2016	The Forests and Service exchange drafts and comments on the draft Assessment and Proposed Action at Level 1 team meetings.
December 2016	The Forests receive final comments from the Service.
January 2017	The Service receives a final Assessment and Proposed Action for the subject action.

PURPOSE and ORGANIZATION of this BIOLOGICAL OPINION

In accordance with the requirements of section 7(a)(2) of the Act and its implementing regulations, the formal consultation process culminates in the Service's issuance of an Opinion that sets forth the basis for a determination as to whether the proposed Federal action is likely to jeopardize the continued existence of listed species or to destroy or adversely modify critical habitat, as appropriate. The regulatory definition of jeopardy and a description of the formal consultation process are provided at 50 CFR¹ 402.02 and 402.14, respectively. If the Service finds that the action is not likely to jeopardize a listed species, but anticipates that it is likely to cause incidental take of the species, then the Service must identify that take and exempt it from the prohibitions against such take under section 9 of the Act through an Incidental Take Statement.

Analytical Framework for the Jeopardy and Adverse Modification Analyses

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis for bull trout in this Opinion relies on four components:

1. *Status of the Species*, which evaluates the rangewide condition of the bull trout, the factors responsible for that condition, and its survival and recovery needs;
2. *Environmental Baseline*, which supplements the findings of the *Status of the Species* analysis by specifically evaluating the condition of bull trout in the action area, the factors responsible for that condition, and the role of the action area in the survival and recovery of the bull trout;
3. *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on bull trout; and
4. *Cumulative Effects*, which evaluates the effects of future, non-Federal activities reasonably certain to occur in the action area on bull trout. Future Federal actions that are unrelated to

¹ CFR represents the Code of Federal Regulations which is a codification of the general and permanent rules published in the Federal Register by Executive departments and agencies of the Federal Government. It is published by the Office of the Federal Register National Archives and Records Administration. More information can be found at <http://www.gpoaccess.gov/cfr/index.html>

the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of bull trout current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of bull trout in the wild, at the rangewide scale.

Interim recovery units were defined in the final listing rule for bull trout for use in completing jeopardy analyses (USFWS 1999, p. 58910). Subsequently, the Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*), released by the Service in September 2015, formally established six bull trout recovery units, each of which is individually necessary to conserve the entire listed entity (USFWS 2015a, p. 33). Pursuant to Service policy, when an action impairs or precludes the capacity of a recovery unit from providing both the survival and recovery function assigned to it, that action may represent jeopardy to the species. When using this type of analysis, the biological opinion describes how the action affects not only the recovery unit's capability, but the relationship of the recovery unit to both the survival and recovery of the listed species as a whole. The following analysis uses this approach and considers the role of the action area and core area (discussed below under the Status of the Species section) in the function of the recovery unit as context for evaluating the effects of the proposed Federal action, together with any cumulative effects, on the survival and recovery of the bull trout to make the jeopardy determination. Please note that consideration of the recovery units for purposes of the jeopardy analysis is done within the context of making the jeopardy determination at the scale of the entire listed species in accordance with Service policy (USFWS 2006).

Destruction or Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or adversely modify designated critical habitat (CH). A final rule revising the regulatory definition of "destruction or adverse modification" was published on February 11, 2016 (81 FR 7214). The final rule became effective on March 14, 2016. The revised definition states:

"Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

The destruction or adverse modification analysis in this Opinion relies on four components:

1. The *Status of Critical Habitat* analysis, which describes the rangewide condition of CH in terms of key components (i.e., essential habitat features, primary constituent elements, or physical or biological features) that provide for the conservation of the listed species, the

factors responsible for that condition, and the intended value of the CH overall for the conservation/recovery of the listed species;

2. The *Environmental Baseline* analysis, which analyzes the condition of CH in the action area, the factors responsible for that condition, and the value of the CH in the action area for the conservation/recovery of the listed species;
3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the key components of CH that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of affected CH; and
4. The *Cumulative Effects*, which evaluate the effects of future, non-Federal activities that are reasonably certain to occur in the action area on the key components of CH that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected CH. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

For purposes of making the destruction or adverse modification determination, the Service evaluates if the effects of the proposed Federal action, taken together with cumulative effects, are likely to impair or preclude the capacity of CH in the action area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of CH for the conservation of the listed species. The key to making that finding is understanding the value (i.e., role) of the CH in the action area for the conservation/recovery of the listed species based on the *Environmental Baseline* analysis.

I. DESCRIPTION OF THE PROPOSED ACTION

A. Action Area

The term “action area” is defined in the regulations as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” An action includes activities or programs “directly or indirectly causing modifications to the land, water, or air” (50 CFR 402.02). In this case, the area where land, water, or air is likely to be affected includes all lands managed by the Forests, excluding wilderness areas in the Boise NF (Figure 1). The action area encompasses approximately 4.3 million acres, and includes 95 watersheds (5th level Hydrologic Unit Code [HUC]) comprised of 561 subwatersheds (6th level HUCs) (Assessment, pp. 6, 11). Currently, 157,000 acres of inventoried non-native invasive plant infestations in over 25,981 locations are known to occur in this area (Figure 2 and Table 1, 2).

B. Proposed Action

The term “action” is defined in the implementing regulations for section 7 as “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas” (50 CFR 402.02).

The Forests propose to treat noxious and invasive plant species, prevent further spread of existing invasive plant species, and eradicate existing populations where possible in order to maintain native plant communities. The proposed action would implement an adaptive integrated weed management (IWM) strategy on the Forests to eradicate or control existing or newly discovered invasive plants and allow for additional treatment emphasis on burned areas at high risk of infestation following wildfire.

The proposed adaptive IWM program would utilize a variety of tools, used alone or in combination, to treat invasive plants on the Forests. The following treatment methods are proposed (Proposed Action, p. 1):

- Biological control through the use of predators, parasites, and pathogens, and through targeted grazing;
- Herbicide control using ground-based spot and broadcast application methods;
- Herbicide control using helicopter aerial application methods;
- Herbicide control using aquatic application methods (only in waterbodies not supporting listed species);
- Manual and mechanical methods such as hand-pulling, mowing, cutting, or torching; and,
- Rehabilitation and restoration methods such as site preparation and seeding.

The Proposed Action identifies an annual program of work with treatments of up to 20,000 “treated acres” of invasive plants annually outside of areas burned by wildfire on each Forest. The Forests propose to use “applied acres” to document herbicide use. Applied acreage is defined by the Forests as the actual acres that receive herbicide based on the active ingredient. Applied acres are a portion of the defined treated acre polygon which also includes untreated areas (areas receiving no herbicide directly).

Both Forests have experienced large, uncharacteristic wildfires over the last decade, leaving thousands of acres at very high risk for infestation by invasive plants. Additionally, the Sawtooth NF is expected to have increasing risk of fire. To address this risk, the proposed action also allows for treating up to 20,000 acres newly impacted by wildfire on each Forest. These additional wildfire acres would continue to be treated annually for up to 5 years, as needed, to reduce the risk of infestation. Combining the annual program of work and treatment of wildfire areas, the total maximum acres that could be treated by all methods on each Forest annually is 40,000 acres (Table 3). The maximum annual treated acres using herbicide is 36,000 acres per Forest (Proposed Action, p. 2).

Figure 1. Sawtooth and Boise National Forests Ranger Districts

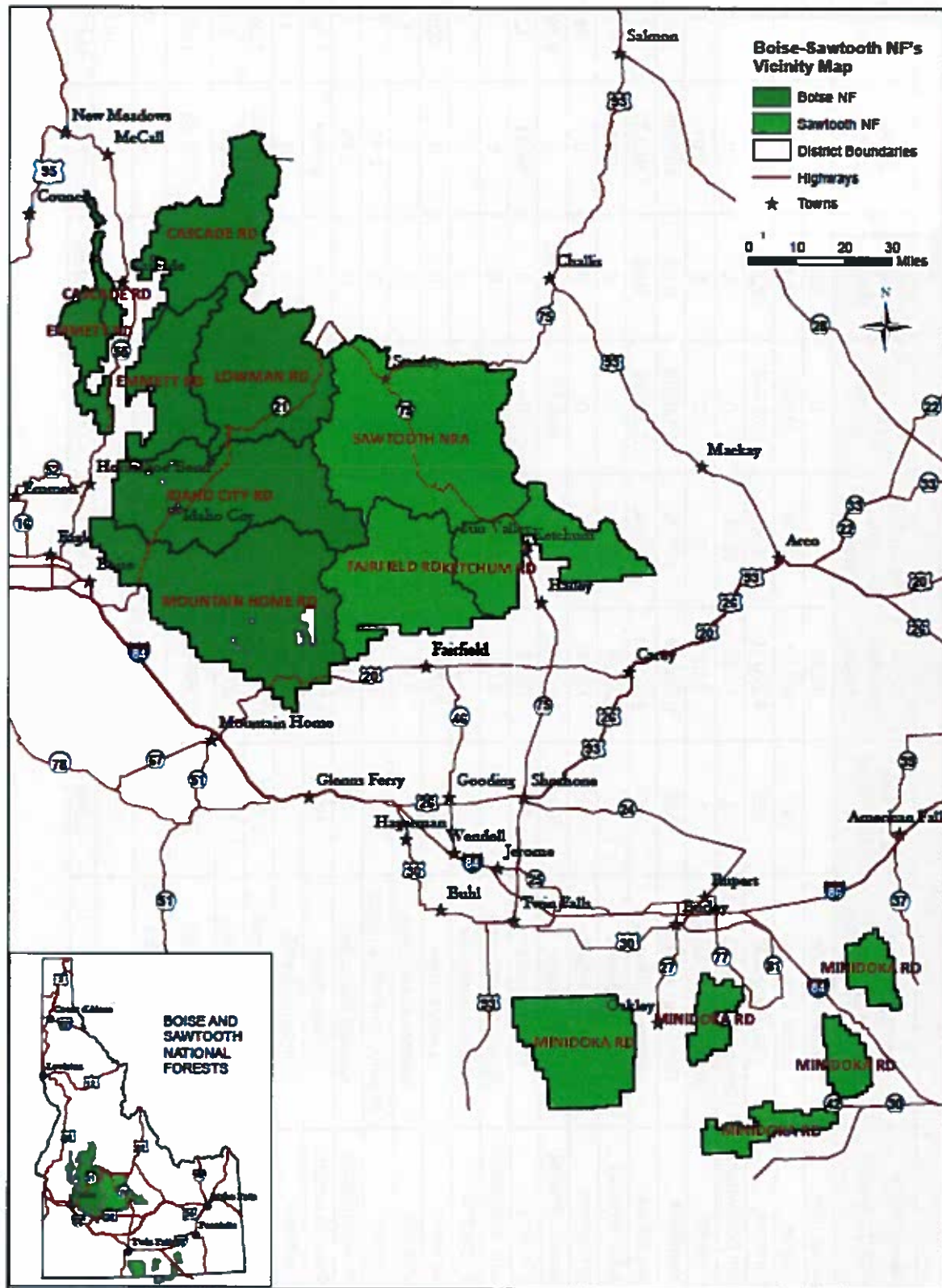


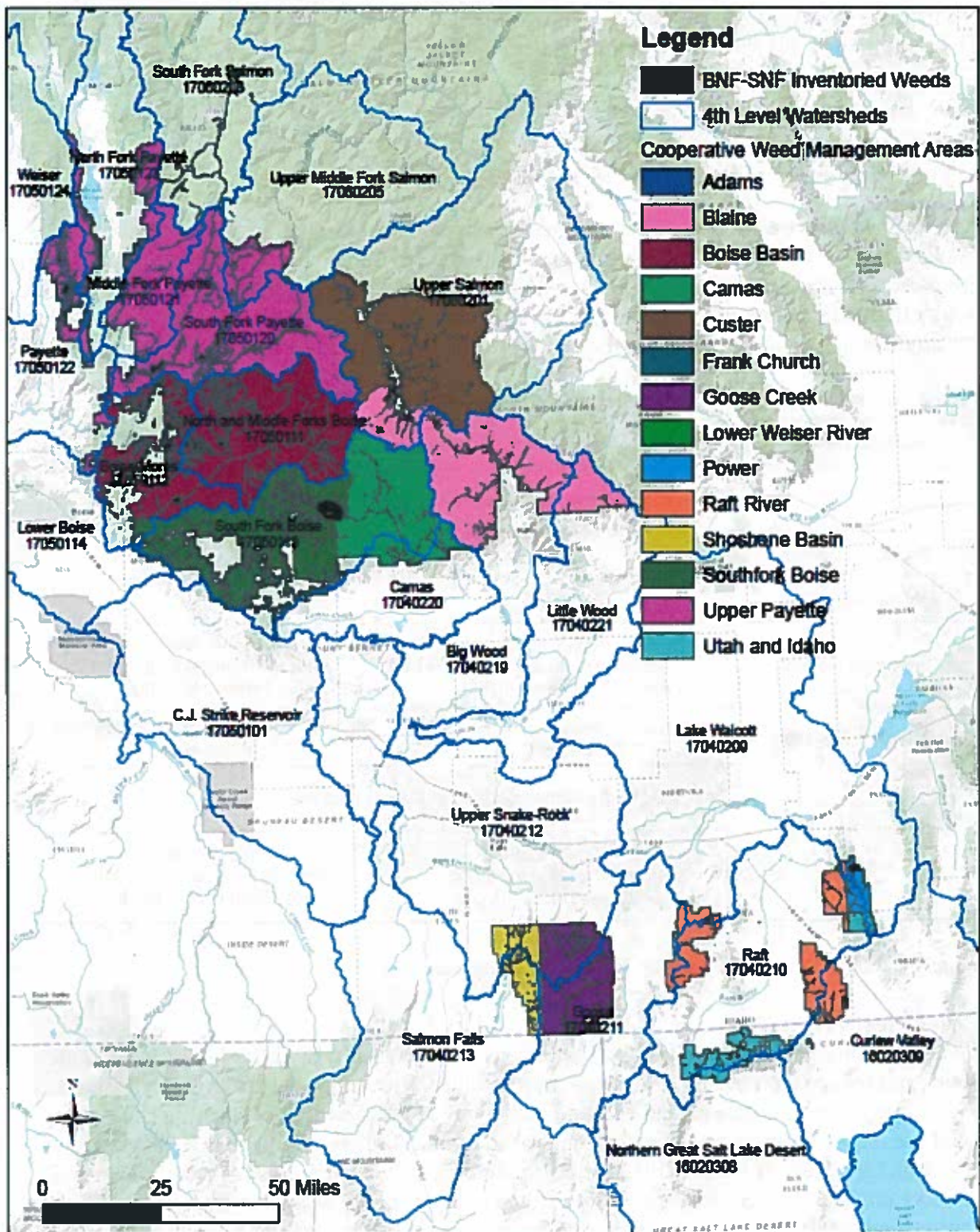
Table 1. Inventoried non-native invasive plant species infestations by District on the Boise National Forest								
Invasive Plant Scientific Name	Invasive Plant Common Name	Number of Infestations	Total Infested Acres	Mountain Home (acres)	Idaho City (acres)	Cascade (acres)	Lowman (acres)	Emmett (acres)
<i>Hyoscyamus niger</i>	Black Henbane	7	92.20	0	0	92.2	0	0
<i>Linaria vulgaris</i>	Butter and eggs	96	996.17	276.26	331.64	0.37	388.27	0
<i>Cirsium arvense</i>	Canada thistle	553	4,279.10	8.02	1,251.44	893.59	682.28	1,443.77
<i>Hypericum perforatum</i>	Common St. John's wort	6	13.51	13.51	0	0	0	0
<i>Echium vulgare</i>	Common viper's bugloss	3	0.01	0	0	0	0.01	0
<i>Linaria dalmanica</i>	Dalmatian toadflax	535	6,038.54	167.28	4,142.20	0.05	167.28	55.43
<i>Centaurea diffusa</i>	Diffuse knapweed	349	4,025.33	550.43	3,235.36	0.59	1,683.12	62.84
<i>Convolvulus arvensis</i>	Field bindweed	10	29.25	29.14	0	0	0.11	0
<i>Dipsacus fullonum</i>	Fuller's teasel	10	78.76	0	0	0	0	78.76
<i>Cynoglossum officinale</i>	Gypsyflower	1014	5,142.12	188.28	986.18	1157.82	0	2,809.83
<i>Berteroa incana</i>	Hoary alyssum	88	78.25	1.18	0	0	64.81	12.27
<i>Polygonum cuspidatum</i>	Japanese knotweed	1	0.02	0.02	0	0	0	0
<i>Aegilops cylindrica</i>	Jointed goatgrass	3	1.29	1.29	0	0	0	0
<i>Euphorbia esula</i>	Leafy spurge	315	727.27	501.38	0	0	0	225.88
<i>Salvia aethiopsis</i>	Mediterranean sage	1	3.46	0	0	0	0	3.46
<i>Carduus nutans</i>	Nodding plumeless thistle	33	2.97	0	0	0	2.97	0
<i>Hieracium aurantiacum</i>	Orange hawkweed	7	2.48	0	0	0	2.48	0
<i>Leucanthemum vulgare</i>	Oxeye daisy	197	5,676.00	5.28	3,986.05	0	165.91	1,518.77
<i>Lythrum salicaria</i>	Purple loosestrife	2	3.62	0	0	0	0	3.62
<i>Chondrilla juncea</i>	Rush skeletonweed	3,779	47,763.88	7,619.25	807	2,443.10	9,052.11	5,843.97
<i>Onopordum acanthium</i>	Scotch cottonthistle	52	98.31	89.02	0	0	0.26	9.03
<i>Centaurea stoebe ssp. micranthos</i>	Spotted knapweed	2,272	15,929.60	776.83	8,102.07	3,299.78	1,765.83	1,985.10
<i>Potentilla recta</i>	Sulphur cinquefoil	5	5.40	0	0	5.40	0	0
<i>Cardaria draba</i>	whitetop	58	163.38	155.33	0	0	0	8.05
	Total	9,396	91,150.91	10,382.61	44,840.02	7,892.89	13,974.61	14,060.78

Table 2. Inventoried non-native invasive plant species infestations by District on the Sawtooth National Forest

Invasive Plant Scientific Name	Invasive Plant Common Name	Number of Infestations	Total Infested Acres	Minidoka (acres)	Fairfield (acres)	Ketchum (acres)	Sawtooth NRA (acres)
<i>Hyoscyamus niger</i>	Black Henbane	16	88.23	82.93	0	0	5.30
<i>Cirsium vulgare</i>	Bull thistle	186	3,621.26	2,881.53	0	0	739.73
<i>Arcium</i>	burdock	18	75.86	75.86	0	0	0
<i>Bassia scoparia</i>	Burning bush	2	2.15	2.15	0	0	0
<i>Linaria vulgaris</i>	Butter and eggs	837	10,723.32	0	351.64	0.70	10,370.98
<i>Cirsium arvense</i>	Canada thistle	501	9,698.14	5418.10	289.72	286.22	3,704.10
<i>Bromus tectorum</i>	cheatgrass	7	423.49	423.49	0	0	0
<i>Verbascum thapsus</i>	Common mullein	83	68.49	9.20	0	0	59.29
<i>Hypericum perforatum</i>	Common St. John's wort	5	0.10	0	0.10	0	0
<i>Tanacetum vulgare</i>	Common tansy	25	12.94	0	0	0	12.94
<i>Linaria dalmatica ssp. dalmatica</i>	Dalmatian toadflax	222	2,141.48	0	1.94	554.88	192
<i>Centaurea diffusa</i>	Diffuse knapweed	217	2,145.37	1,002.26	802.95	54.59	285.56
<i>Isatis tinctoria</i>	Dyer's woad	5	56.89	48.85	0	0	8.04
<i>Thlaspi arvense</i>	Field pennycress	15	3.25	0	0	0	3.25
<i>Forb, biennial</i>	Forb, biennial	3	0.13	0	0	0	0.13
<i>Forb, docot</i>	Forb, docot	5	0.26	0	0	0	0.26
<i>Cynoglossum officinale</i>	Gypsyflower	150	2,241.08	2,212.63	20.46	0	7.99
<i>Acroptilon repens</i>	Hardheads	3	2.83	2.83	0	0	0
<i>Descurainia sophia</i>	Herb sophia	19	3.16	0	0	0	3.16
<i>Berteroa incana</i>	Hoary alyssum	17	57.55	0	57.18	0	0.36
<i>Euphorbia esula</i>	Leafy spurge	2053	14,124.90	407.79	13717	0	0.11
<i>Cardaria chalapensis</i>	Lendspod whitetop	3	4.45	4.45	0	0	0
<i>Ceanothus maritimus</i>	Maritime ceanothus	1	7.21	0	0	0	7.21
<i>Carduus nutans</i>	Nodding plumeless thistle	109	2,324.45	1,610.47	0	0	713.98
<i>Hieracium aurantiacum</i>	Orange hawkweed	1	2.40	0	0	0	2.4

Table 2. Inventoried non-native invasive plant species infestations by District on the Sawtooth National Forest							
Invasive Plant Scientific Name	Invasive Plant Common Name	Number of Infestations	Total Infested Acres	Minidoka (acres)	Fairfield (acres)	Ketchum (acres)	Sawtooth NRA (acres)
<i>Leucanthemum vulgare</i>	Oxeye daisy	4	2.63	0	0	0	2.63
<i>Lythrum salicaria</i>	Pitseed goosefoot	65	67.16	0	0	0	67.16
<i>Chondrilla juncea</i>	Rush skeletonweed	616	4,916.78	0	3,928.71	0.09	987.98
<i>Tamarix ramosissima</i>	Salt cedar	1	0.03	0.03	0	0	0
<i>Onopordum acanthium</i>	Scotch cottonthistle	35	292.68	292.57	0	0.11	0
<i>Bromus inermis</i> ssp. <i>inermis</i> var. <i>inermis</i>	Smooth brome	22	40.06	40.06	0	0	0
<i>Centaurea stoebe</i> ssp. <i>micranthos</i>	Spotted knapweed	1,901	10,257.37	528.41	669.45	1,383.03	7,676.47
<i>Senecio jacobaea</i>	Slinking willie	3	2.54	0	0	0	2.54
<i>Descurainia</i>	Tansy mustard	1	0.00	0	0	0	0.01
<i>Cardaria draba</i>	Whitetop	25	188.44	188.32	0	0	0.12
<i>Centaurea solstitialis</i>	Yellow star-thistle	1	0.01	0	0.01	0	0
<i>Medicago officinalis</i>	Yellow sweet clover	12	0.56	0	0	0	0.56
	Total	16,585	63,597.66	15,231.95	19,839.17	2,286.83	26,239.71

Figure 2. HUC 4 Subbasins, Cooperative Weed Management Areas, and inventoried weed infestations within the Action Area



Proposed applied acres within 100 feet of bull trout waters was calculated for the Forests by doubling the maximum applied acres per Forest per year (over the past 5 years) and adding a 15% increase to cover expected increase in wildfire and potential for infestation over the next 15 years (B. Mitchell 2017, personal communication, 3 April).

- *Boise:* $34 \text{ acres} \times 2 = 68 \text{ acres} + 15\% = 78 \text{ acres}$
- *Sawtooth:* $17 \text{ acres} \times 2 = 34 \text{ acres} + 15\% = 39 \text{ acres}$

Invasive plant sites discovered subsequent to the current invasive plant inventory would be evaluated to determine if the eradication treatments and environmental impacts are consistent with those analyzed in the Assessment. Monitoring will be conducted to determine how well the design criteria are being implemented. Design criteria are intended to protect aquatic and terrestrial resources by ensuring that the actions fall within a specific range of effects.

Table 3. Maximum treated acres annually, per Forest, by treatment method

Treatment Method	Boise NF	Sawtooth NF
Routine Annual Program of Work		
Biological Control	2,000	2,000
Mechanical Control	2,000	2,000
Herbicide Control	16,000 total Ground Treatment - 8,000 Aerial Treatment - 8,000	16,000 total Ground Treatment - 8,000 Aerial Treatment - 8,000
Aquatic Application	Unknown – infestations known to be present	Unknown - no documented infestations at present
Post Wildfire Treatment – up to five years post-fire		
Herbicide	20,000 total Ground Treatment – 5,000 Aerial Treatment – 15,000	20,000 total Ground Treatment – 5,000 Aerial Treatment – 15,000

The proposed action consists of the following components:

1. Biological Treatments

Biocontrol would use plant predators or pathogens to attack and weaken target invasive plant species and reduce their ability to compete or reproduce. Biocontrol agents typically include host-specific insects, mites, nematodes, and pathogens of a targeted plant species. The Forests would use only biological control agents approved by the Animal and Plant Health Inspection Service and the State of Idaho. This method would be used when the target species occupies extensive portions of the landscape, other methods of control are prohibitive based on cost or location, and an effective biological control regime exists. Biological control may be used to supplement herbicide control in larger infestations where treatments cannot be accomplished

regularly. A maximum of 2,000 acres per forest may be treated each year with this method (Proposed Action, pp. 3-4).

2. Herbicide Application

This method involves the use of herbicides and associated adjuvants. Ground-based or aerial application of herbicides would be used based on: a) treatment objective and priority of the target invasive plant species; b) accessibility, topography, and size of the treatment area; c) the expected efficiency and effectiveness of the method selected; d) the risk for spread or invasion into other locations; and e) the potential to harm priority habitats and vegetation complexes such as those associated with threatened, endangered, or sensitive species (Proposed Action, pp. 5-6). Herbicide application methods (Proposed Action, p. 6) include:

- **Spot spraying** - This method targets individual plants and the immediate areas around them. Most spot spraying is usually done with a backpack sprayer; however, spot spraying may also be applied using a hose from a truck-mounted or off-highway-vehicle (OHV)-mounted tank, or tanks mounted on pack animals. This is the most common herbicide application method.
- **Hand Selective** - This method targets individual plants. Herbicide would be applied by wicking, wiping, basal bark, hack & squirt, and stem injections.
- **Broadcast** - This method applies herbicide to cover an area of ground rather than individual plants. This method may employ a spray system mounted on a truck or OHV. Broadcast applications are used in areas where invasive plants occupy a large percentage of plant cover on the site, making spot spraying impractical.
- **Aquatic application** - This application method would be used in response to Early Detection and Rapid Response (EDRR) associated with aquatic invasive plant species. This method may employ spot or broadcast spray over the surface of or into water. Application methods may be from shore using backpacks, truck-mounted or OHV-mounted tanks, or from boats.
- **Aerial application** - This method would be used in areas where physical features, such as topography, restricted access, size and/or rate of spread of infestation, personnel safety, or other factors (such as prohibitive cost of ground application) occur. Invasive plants would be treated with herbicides through the use of helicopters.

Herbicide formulations and mixtures could contain one or more of the active ingredients displayed in Table 4. (Proposed Action, p. 7). Specific exposure risks, typical end-use products and toxicological effects for each herbicide are presented in the Assessment (Appendix E).

Table 4. Herbicides and application settings currently used and proposed for use, Boise and Sawtooth National Forests

Herbicide (Active Ingredient)	Commonly Used Brand Names	Maximum Application Rate (active ingredient [ai] or acid equivalent [ae]/acre)	Typical Application Rate (lbs active ingredient [ai] or acid equivalent [ae]/acre)	General Location			
				Vegetation— Away From water	Vegetation— Near Water	Aerial Delivery	Aquatic (in Water)
2,4-D amine	Amine 4, Weedar® 64	2.0 lb ae/acre/app 4.0 lb/ae/acre/year	1.0–2.0 lb ae/ac	X	X		
Aminopyralid	Milestone®	0.11 lb ae/acre/year	0.078–0.11 lb ae/ac	X	X	X	
Chlorsulfuron	Telar®	0.02 product/acre/year (0.12 lb ai/acre/year)	0.01–0.02 lb ai/ac	X	X	X	
Clpyralid	Transline®	0.5 lb ae/acre/year	0.1–0.5 lb ae/ac	X	X	X	
Dicamba	Banvel®	1.0 lb ai/acre/app 2.0 lb ai/acre/year	0.5–2.0 lb ai/ac	X			
Fluroxypyr	Vista® XRT®, Starane®, Spotlight®	0.5 lb ae/acre/year	0.25 lb ae/ac	X			
Glyphosate	Rodeo®, Roundup®, Accord®	1.7 lb ae/acre/app 4.0 lb ae/acre/year	0.5–3.0 lb ae/ac	X	X		X
Imazapic	Plateau®	0.1875 lb ai/acre/year	0.09–0.16 lb ai/ac	X	X	X	
Imazapyr	TVC Total Vegetation Control®, Assault®, Chopper®, Arsenal®	1.5 lb ae/acre/year	1.0 lb ae/ac	X	X		X
Imazamox	Beyond®, Raptor®	0.5 lb ae/acre/year	0.5 lb ae/ac		X		X
Metsulfuron-methyl	Escort®	0.15 lb ai/acre/year	0.01–0.02 lb ai/ac	X	X	X	
Picloram	Tordon™	1.0 lb ai/acre/year	0.25–1.0 lb ai/ac	X		X	
Sulfometuron methyl	Oust Weed Killer® DPX 5648	0.03–0.281 lb ai/acre/app 0.03–0.38 lb ai/acre/year	0.09–0.38 lb ai/ac	X	X	X	
Triclopyr TEA: triethylamine salt	Element 3A®, Garlon 3A®	2.0 lb ae/acre/year	1–2.0 lb ae/ac	X	X		X

Adjuvants and other inert ingredients are specially designed chemical solutions that are added to an herbicide solution to improve the performance of the total mixture. These inert ingredients are not regulated by the EPA in the same way that herbicides are. Polyoxyethylamine (POEA), an adjuvant more toxic than the associated active ingredient glyphosate (original formulation of RoundUp®), will only be used in uplands where there is no potential for movement to aquatic systems. Otherwise, only adjuvants and inert ingredients that are non-toxic to slightly toxic to fish will be used, such as those identified by Washington State Department of Ecology and Agriculture (Washington State 2012). An analysis of the toxicity of proposed adjuvants and inert ingredients is provided in the Assessment (Appendix D).

3. Mechanical and Manual Control

Mechanical and manual treatments are typically used to remove seed heads, individual plants, or small infestations. They may be used in sensitive areas to avoid impacts to non-target species or water quality or to prevent seed production.

The term “manual” defines treatments such as hand pulling or using hand tools (e.g., hand clippers, hoes, rakes, shovels) to remove plants or cut off seed heads. Manual treatments can be effective for annual and tap-rooted invasive plants, but are ineffective against perennial invasive plants with deep underground stems or roots or fine rhizomes that can be easily broken and left behind to resprout. This method might need to be repeated several times throughout the growing season, depending on the species. This treatment may require digging below the soil surface to remove the main root of plants.

The term “mechanical” refers to the use of equipment and power tools, including actions like mowing, torching (i.e., using a propane burner to kill invasive plants with heat), and weed whipping. Choosing the appropriate power tool depends on characteristics of the target weed species (e.g., stem size or sprouting ability); density of the target species; size of the infestation; site location and condition; and soil or topographic considerations. Mechanized treatments are typically used to remove flowering stems to prevent seed production or to reduce or remove aboveground biomass. Each forest may treat up to 2,000 acres annually with these methods (Proposed Action, p. 15).

4. Monitoring and Early Detection and Rapid Response (EDRR)

Monitoring is an integral part of any adaptive IWM program. Monitoring addresses EDRR and treatment, informing future decision-making and strategy. Both quantitative and qualitative monitoring efforts are included in the overall monitoring program. Post-treatment reviews of monitoring data would occur on a sample basis to determine whether treatments were effective, the type and extent of damage which may have occurred to non-target species, whether design criteria were applied correctly, and if recovery occurred as expected (Proposed Action, p. 16).

Re-treatment and active rehabilitation or restoration prescriptions would be developed as needed based on post-treatment results. Changes in treatment methods would occur based on effectiveness of treating the invasive plant infestations (Proposed Action, p. 17).

5. Rehabilitation and Restoration

Severely damaged treatment sites or sites at which few desirable species remain may not be able to recover without intervention. Rehabilitation and restoration are vital components of the Project. Rehabilitation is defined as short-term mitigation to ensure minimum site stability and functionality. Rehabilitation may include site preparation and seeding of desirable vegetation when passive restoration is not likely to be successful. Rehabilitation and restoration activities are limited to 25 acres per project (Proposed Action, p. 17).

C. Term of Action

The Forests proposes to implement the adaptive integrated Project over the next 15 years, as funding allows. On that basis, the Service considers the term of the action to extend to May 30, 2032, provided there are no changes to trigger reinitiation of this consultation.

D. Proposed Program Design Criteria

The Forests have identified specific program design criteria to reduce or eliminate adverse impacts of the Project. Implementation of the design criteria is mandatory (Assessment, p. 59). The Service considers the program design criteria essential to limit impacts to bull trout and its habitat. If any of the criteria are not implemented, there may be effects of the action that were not considered in this Opinion, and reinitiation of consultation may be required. Project design criteria pertinent to bull trout and its habitat are summarized below. A complete list of design criteria and best management practices (BMPs) can be found in the Proposed Action (pp. 5, 8-15, 16, 17-18).

1. Biological Treatment Design Criteria

- Targeted grazing will not occur in riparian areas.
- A site specific project operation plan will be required prior to initiating a prescriptive livestock grazing treatment and presented to Level I team when treating near waters supporting populations of federally listed species.
- Concurrence will be obtained from the Level I team that the site specific plan would avoid adverse effects to listed species before the plan is implemented.

2. Herbicide Application Design Criteria

- Herbicide applicators will obtain a weather forecast for the area prior to initiating a spraying project to ensure no precipitation or wind events are predicted to occur during or immediately after spraying that could allow runoff or drift into waterbodies.
- Monitor wind speed and direction and equipment and spray parameters throughout herbicide application. Do not apply herbicide in sustained wind conditions exceeding 5 miles per hour in riparian areas, or in any wind conditions exceeding product label directions.
- No spraying will occur if precipitation is occurring or is imminent (within 24 hours of application).

- Herbicides would be applied only when wind speeds are less than 8 miles per hour (mph).
- Transport only the quantity of herbicide and adjuvants needed for a project. Transport secured containers in such a way as to prevent the likelihood of spills, and make periodic checks en-route to help avoid spillage. When supplies need to be transported over water by boat, raft, or other watercraft, carry herbicides and adjuvants in watertight, floatable containers.
- Follow the procedures in the Forests' Spill Plans in the event of a spill. The Forests' Spill Plans will be compliant with National Pollution Discharge Elimination System.
- Use indicator dye in the herbicide mix to visually ensure uniform coverage and minimize overlapped or skipped areas and treatment of non-target areas.
- Use low pressure and larger droplet sizes, to the extent possible with the equipment being used, to minimize herbicide drift during broadcast operations. Use nozzles designed for herbicide application.
- Water used for mixing will be obtained prior to going into the field. Water may be transported via back-pack sprayers, saddle tanks, or portable containers to mixing site in the back country locations. Where herbicides are mixed, mixing/filling and storing of sprayers will not occur within 100 feet of live water. Mixing/filling will be limited to locations where drainage will not allow runoff or spills to move into live water, and in locations where potential contamination of ground water will not occur.

Fisheries/Water

- Applicators are required to use more risk-averse application methods in sites that are close to stream channels. Key provisions include using the least toxic chemicals to aquatic resources near water, and more precise herbicide application methods in stream side areas, such as wicking, wiping, or hand spraying with a single nozzle.
- Broadcast application is used no closer than 100 feet to open water and specific buffers will be employed for focused spot and hand select applications along all flowing water streams and ponded waterbodies as per guidelines in the Proposed Action, Appendix C. Glyphosate with POEA will not be used closer than 100 feet with any application method.
- Dyes would be used in riparian areas and other areas to provide visual evidence of treated vegetation. Water-soluble colorants, such as Hi-Light blue dye, would be used within 100 feet of water and other situations, as needed, to enable applicators and inspectors to properly apply herbicides.
- Fuel storage and/or refueling will not occur within Riparian Conservation Areas (RCAs). Engine and hydraulic fluids will be monitored for leaks.
- All equipment used for treatments will be cleaned of external oil, grease, dirt and mud, and leaks repaired, before entering areas that drain directly to streams or wetlands. Spill packs will also be on hand for minor leaks/spills.
- The POEA adjuvant (e.g., Roundup Pro) will only be used in uplands where there is no potential for movement into aquatic systems.
- Only herbicides labelled for aquatic application will be used up to the high water mark. Those herbicides with low to moderate risk will be used with distance guidelines defined in the Proposed Action, Appendix C.

- For listed fish species, treatment areas will be identified on maps available at the district offices. The herbicides used, dates of use, and name and phone number to contact for more information will also be available.

Aerial Herbicide Application

- Apply a 300-foot, no-aerial application herbicide buffer around all live water (i.e., perennial streams, flowing intermittent streams, lakes, ponds, springs, and wetlands).
- Do not apply aerial herbicide treatments when sustained wind speeds exceed 5 mph or label recommendations, whichever is less.
- Do not apply aerial herbicide treatments during inversions, below minimum relative humidity, or above maximum temperature, as stated on the label.
- Obtain a weather forecast for the area prior to initiating a spraying project to ensure no precipitation or wind events are predicted to occur during or immediately after spraying that could allow runoff or drift into waterbodies.
- Identify aerial spray units (and perennial and intermittent streams, perennial seeps, ponds, springs, and wetlands in proposed aerial units) prior to spraying to ensure only appropriate portions of the unit are aerially treated. Map each treatment unit before the flight and use a Global Positioning System (GPS) system in spray helicopters to ensure that only areas marked for treatment are treated. Place drift monitoring cards out to 300 feet from and perpendicular to perennial streams to monitor herbicide presence.
- In the unlikely event that drift does occur into the 300-foot buffer, applicators will modify practices during the operation and prevent any additional impacts.

3. Mechanical and Manual Design Criteria

- Treatments in RCAs will be accomplished by hand or with hand tools that do not disturb the soil (e.g., chainsaws, power brush saws, and line trimmers).
- Maintain a 25 foot vegetative buffer next to live water to leave ground cover intact and prevent erosion into streams or adjacent waterbodies.

4. Rehabilitation and Restoration Design Criteria

- When working in watersheds with federally listed species, mechanical ground disturbing activities will not be conducted adjacent to or within RCAs during the spawning season.

II. STATUS OF BULL TROUT

This section presents information about the regulatory, biological, and ecological status of bull trout at a rangewide scale that provides context for evaluating the significance of probable effects caused by the proposed action.

A. Regulatory Status

1. Listing Status

The coterminous United States population of bull trout was listed as threatened under the Act on November 1, 1999 (USFWS 1999, p. 58910). The threatened bull trout occurs in the Klamath River Basin of south-central Oregon and in the Jarbidge River in Nevada, north to various coastal rivers of Washington to the Puget Sound and east throughout major rivers within the Columbia River Basin to the St. Mary-Belly River, east of the Continental Divide in northwestern Montana (USFWS 1999, pp. 58910-58916).

The bull trout was initially listed as three separate Distinct Population Segments (DPSs) (USFWS 1999, p. 58910). The preamble to the final listing rule discusses the consolidation of these DPSs, plus two other population segments, into one listed taxon and the application of the jeopardy standard under section 7 of the Act relative to this species (USFWS 1999, p. 58910):

"Although this rule consolidates the five bull trout DPSs into one listed taxon, based on conformance with the DPS policy for purposes of consultation under section 7 of the Act, we intend to retain recognition of each DPS in light of available scientific information relating to their uniqueness and significance. Under this approach, these DPSs will be treated as interim recovery units with respect to application of the jeopardy standard until an approved recovery plan is developed. Formal establishment of bull trout recovery units will occur during the recovery planning process."

Please note that consideration of the interim recovery units for purposes of the jeopardy analysis is done within the context of making the jeopardy determination at the scale of the entire listed species in accordance with Service policy (USFWS 2006). See the analytical framework for the jeopardy determination discussed above that explains the use of recovery units in the jeopardy analysis.

2. Threats

Throughout its range, the bull trout is threatened by the combined effects of habitat degradation, fragmentation, and alterations associated with dewatering, road construction and maintenance, mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduced nonnative species (USFWS 1999, p. 58912).

3. Climate Change

Climate change represents a relatively new threat to bull trout. The current change in world climate is trending toward warmer temperatures (Intergovernmental Panel on Climate Change 2007). Because bull trout are dependent on cold water temperatures, changes toward higher average temperatures could effectively reduce its available habitat (Rieman et al. 2007, p. 4). Rieman et al. (2007, p. 14) found that a change of 0.6 to 5° Celsius (C) could reduce the percent of large habitat patches by 27 to 97 percent across the bull trout's range.

In Central Idaho, habitat may be affected less by climate change than other areas of the bull trout's range because of the wide range in elevation of current habitat distribution. Given the broad range of the estimate above for reduction of large habitat patches, it is difficult to reasonably interpret what impact the actual changes to bull trout habitat are likely to have on the survival and recovery of the bull trout throughout its range. Rieman et al. (2007, p. 17) caution that their results cannot be extrapolated directly for management of bull trout without consideration of many other factors. Until better models are developed on which to base an understanding of climate change-related effects on the bull trout, Rieman et al. (2007, p. 17) suggest continuation of bull trout conservation efforts to maximize its resiliency.

B. Survival and Recovery Needs

1. Recovery Planning

Between 2002 and 2004, three separate draft recovery plans were completed. The 2002 draft recovery plan addressed bull trout populations within the Columbia, Saint Mary-Belly, and Klamath River basins (USFWS 2002, entire), and included individual chapters for 24 separate recovery units (later referred to as management units). In 2004, draft recovery plans were developed for the Coastal-Puget Sound drainages in western Washington (USFWS 2004a) and for the Jarbidge River in Nevada (USFWS 2004b). Those draft plans were not finalized, but have served to identify recovery actions across the range of the species and to provide a framework for implementing numerous recovery actions by our partner agencies, local working groups, and others with an interest in bull trout conservation (USFWS 2015a, p. 2).

The Service released the final bull trout recovery plan in September 2015 (USFWS 2015a, entire). The final plan incorporated and built upon new information collected on status of bull trout, factors affecting the species, and ongoing conservation efforts across the range of the species since the draft 2002 and 2004 recovery planning efforts. The 2002 and 2004 draft recovery plans provide life history information, habitat characteristics, reasons for decline, and distribution and abundance of bull trout subpopulations covered by those draft plans. The 2015 final recovery plan, utilizing new information and reanalysis, identified six biologically-based recovery units (USFWS 2015a, p. 33). Recovery actions for each of the six recovery units include:

- Protect, restore, and maintain suitable habitat conditions for bull trout;

- Minimize demographic threats to bull trout by restoring connectivity or populations where appropriate to promote diverse life history strategies and conserve genetic diversity;
- Prevent and reduce negative effects of nonnative fishes and other nonnative taxa on bull trout; and,
- Work with partners to conduct research and monitoring to implement and evaluate bull trout recovery activities, consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks, and considering the effects of climate change (USFWS 2015a, pp. 50-53).

A Recovery Unit Implementation Plan (RUIP) was developed for each unit, and the Service's Bull Trout Recovery Implementation Team is currently developing guidance on implementation of the RUIPs. While the 2015 final recovery plan supersedes and replaces the previous draft recovery plans, the 2002 and 2004 draft recovery plans still provide important information on bull trout status and life history.

Each of the six recovery units consists of one or more core areas. Approximately 109 occupied core areas are recognized across the coterminous United States range of the bull trout. In addition, six historically occupied core areas, and two "research needs areas" are identified (USFWS 2015a, p. 34). The occupied core areas can be described as simple or complex, and are composed of one or more local populations. See definitions below.

Core Area: a geographic area within a recovery unit occupied by one or more local bull trout populations. Core areas are functionally similar to a metapopulation, in that bull trout within a core area are much more likely to overlap in their use of rearing, foraging, migratory, and overwintering habitat, and in some cases in their use of spawning habitat, than are bull trout from separate core areas.

- *Simple Core Area:* a geographic area occupied by one bull trout local population. Simple core areas are small in scope, isolated from other core areas by natural barriers, and may contain unique genes or life history adaptations.
- *Complex Core Area:* a geographic area containing multiple bull trout local populations. Complex core areas are found in large watersheds, have multiple life history forms, and have migratory connectivity between spawning and rearing habitat and foraging, migrating, and overwintering habitat.

Local Population: a group of bull trout within a core area that spawn within a particular stream or portion of a stream system. A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit.

C. Rangewide Status and Distribution

The six biologically-based recovery units of the coterminous United States population of bull trout, each of which is individually necessary to conserve the entire listed entity (USFWS 2015a, p. 33), are: (1) Coastal Recovery Unit, (2) Klamath Recovery Unit, (3) Mid-Columbia Recovery Unit, (4) Upper Snake Recovery Unit, (5) Columbia Headwaters Recovery Unit, and (6) Saint

Mary Recovery Unit. A summary of the current status of the bull trout within these units is provided below.

1. Coastal Recovery Unit

The Coastal Recovery Unit is divided into three geographic regions in western Oregon and Washington: Puget Sound, Olympic Peninsula, and Lower Columbia River. Bull trout in the Coastal Recovery Unit exhibit anadromous, adfluvial, fluvial, and resident life history patterns. The anadromous life history form is unique to Puget Sound and Olympic Peninsula regions. This recovery unit contains 21 occupied core areas and 85 local populations, including the Clackamas River core area where bull trout had been extirpated and were reintroduced in 2011. Four historically occupied core areas that could be re-established have been identified. This recovery unit also contains ten shared foraging, migrating, and overwintering (FMO) habitats which are outside core areas and allow for the continued natural population dynamics in which the core areas have evolved. Four core areas within the Coastal Recovery Unit have been identified as current population strongholds: Lower Skagit, Upper Skagit, Quinault River, and Lower Deschutes River. These are the most stable and largest bull trout populations in the recovery unit.

The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, loss of functioning estuarine and nearshore marine habitats, development and related impacts (e.g., flood control, floodplain disconnection, bank armoring, channel straightening, loss of instream habitat complexity), agriculture (e.g., diking, water control structures, draining of wetlands, channelization and the removal of riparian vegetation, livestock grazing), fish passage (e.g., dams, culverts, instream flows) residential development, urbanization, forest management practices (e.g., timber harvest and associated road building activities), connectivity impairment, mining, and the introduction of nonnative species. Conservation measures or recovery actions implemented include relicensing of major hydropower facilities that have provided upstream and downstream fish passage or completely removed dams, land acquisition to conserve bull trout habitat, floodplain restoration, culvert removal, riparian revegetation, levee setbacks, road removal, and projects to protect and restore important nearshore marine habitats.

2. Klamath Recovery Unit

The Klamath Recovery Unit, located in southern Oregon, is the most significantly imperiled recovery unit, having experienced considerable extirpation and geographic contraction of local populations and declining demographic condition, and natural re-colonization is constrained by dispersal barriers and presence of nonnative brook trout (USFWS 2015a, p.39). This recovery unit currently contains three core areas and eight local populations. Nine historic local populations of bull trout have been extirpated, and restoring additional local populations will be necessary to achieve recovery. All three core areas have been isolated from other bull trout populations for the past 10,000 years.

The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, habitat degradation and fragmentation, past and present land use practices, agricultural water diversions, nonnative species, and past fisheries management practices.

Conservation measures or recovery actions implemented include removal of nonnative fish (e.g., brook trout, brown trout, and hybrids), acquiring water rights for instream flows, replacing diversion structures, installing fish screens, constructing bypass channels, installing riparian fencing, culvert replacement, and habitat restoration.

3. Mid-Columbia Recovery Unit

The Mid-Columbia Recovery Unit is located in eastern Washington, eastern Oregon, and portions of central Idaho. The Mid-Columbia Recovery Unit is divided into four geographic regions: Lower Mid-Columbia, Upper Mid-Columbia, Lower Snake, and Mid-Snake. This recovery unit contains 24 occupied core areas, two historically occupied core areas, one research needs area, and seven FMO habitats. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, agricultural practices (e.g., irrigation, water withdrawals, livestock grazing), fish passage (e.g., dams, culverts), nonnative species, forest management practices, and mining. Conservation measures or recovery actions implemented include road removal, channel restoration, mine reclamation, improved grazing management, removal of fish barriers, and instream flow requirements.

4. Upper Snake Recovery Unit (includes the proposed action area)

The Upper Snake Recovery Unit is located in central Idaho, northern Nevada, and eastern Oregon. The Upper Snake Recovery Unit is divided into seven geographic regions: Salmon River, Boise River, Payette River, Little Lost River, Malheur River, Jarbidge River, and Weiser River. This recovery unit contains 22 core areas and 206 local populations, with almost 60 percent of local populations being present in the Salmon River Geographic Region. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, dams, mining, forest management practices, nonnative species, and agriculture (e.g., water diversions, grazing). Conservation measures or recovery actions implemented include instream habitat restoration, instream flow requirements, screening of irrigation diversions, and riparian restoration.

5. Columbia Headwaters Recovery Unit

The Columbia Headwaters Recovery Unit is located in western Montana, northern Idaho, and the northeastern corner of Washington. The Columbia Headwaters Recovery Unit is divided into five geographic regions: Upper Clark Fork, Lower Clark Fork, Flathead, Kootenai, and Coeur d'Alene. This recovery unit contains 35 bull trout core areas, of which 15 are complex core areas and 20 are simple core areas. The 20 smaller core areas are each represented by a single local population, many of which may have persisted for thousands of years despite small populations and their isolation. Fish passage improvements within the recovery unit have reconnected previously fragmented habitats. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, mining and contamination by heavy metals, nonnative species, modified instream flows, migratory barriers (e.g., dams), habitat fragmentation, forest practices (e.g., logging, roads), agriculture practices (e.g., irrigation, livestock grazing), and residential development. Conservation measures or recovery actions implemented include habitat improvement, fish passage, and removal of nonnative species.

Unlike the other recovery units, the Columbia Headwaters Recovery Unit does not overlap with salmon distribution. Therefore, bull trout within the Columbia Headwaters Recovery Unit do not benefit from the recovery actions for salmon (USFWS 2015b, p. D41).

6. St. Mary Recovery Unit

The Saint Mary Recovery Unit is located in Montana, but is heavily dependent on resources in southern Alberta, Canada. Most of the watershed in this recovery unit is located in Canada. The United States portion includes headwater spawning and rearing habitat and the upper reaches of FMO habitat. This recovery unit contains four core areas and eight local populations. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, the Saint Mary Diversion operated by the Bureau of Reclamation (e.g., entrainment, fish passage, instream flows), and nonnative species. The primary issue precluding bull trout recovery in this recovery unit relates to impacts of water diversions, specifically at the Bureau of Reclamation's Milk River Project.

D. Life History

Bull trout exhibit both resident and migratory life history strategies. Both resident and migratory forms may be found together, and either form may produce offspring exhibiting either resident or migratory behavior. Resident bull trout complete their entire life cycle in the tributary (or nearby) streams in which they spawn and rear. The resident form tends to be smaller than the migratory form at maturity and also produces fewer eggs. Migratory bull trout spawn in tributary streams where juvenile fish rear one to four years before migrating to either a lake (adfluvial form), a river (fluvial form), or saltwater (anadromous) to rear as subadults or to live as adults. Bull trout normally reach sexual maturity in four to seven years and may live longer than 12 years. Growth varies depending upon life history strategy. Resident adults range from 6 to 12 inches total length, and migratory adults commonly reach 24 inches or more. They are iteroparous (they spawn more than once in a lifetime), and both repeat-and alternate-year spawning have been reported, although repeat-spawning frequency and post-spawning mortality are not well documented.

The iteroparous reproductive system of bull trout has important repercussions for the management of this species. Bull trout require two-way passage up and downstream, not only for repeat-spawning, but also for foraging. Most fish ladders, however, were designed specifically for anadromous semelparous salmonids (fishes that spawn once and then die, and therefore require only one-way passage upstream). Therefore, even dams or other barriers with fish passage facilities may be a factor in isolating bull trout populations if they do not provide a downstream passage route.

Additional information about the bull trout's life history can be found in the final listing rule (USFWS 1999).

E. Habitat Characteristics

Bull trout have more specific habitat requirements than most other salmonids. Habitat components that influence bull trout distribution and abundance include water temperature,

cover, channel form and stability, valley form, spawning and rearing substrate, and migratory corridors. Watson and Hillman (1997, pp. 247-250) concluded that watersheds must have specific physical characteristics to provide the habitat requirements necessary for bull trout to successfully spawn and rear and that these specific characteristics are not necessarily present throughout these watersheds. Because bull trout exhibit a patchy distribution, even in pristine habitats, fish should not be expected to simultaneously occupy all available habitats.

Migratory corridors link seasonal habitats for all bull trout life histories. The ability to migrate is important to the persistence of bull trout. Migrations facilitate gene flow among local populations when individuals from different local populations interbreed, or stray, to nonnatal streams. Local populations that are extirpated by catastrophic events may also become reestablished by bull trout migrants.

Cold water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams (below 59 °Fahrenheit [F]), and spawning habitats are generally characterized by temperatures that drop below 48 °F in the fall. Thermal requirements for bull trout appear to differ at different life stages. Spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in a given watershed. Optimum incubation temperatures for bull trout eggs range from 35 to 39 °F, whereas optimum water temperatures for rearing range from about 46 to 50 °F (Goetz 1989, pp. 22, 24, 39). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996, pp. 629-630) observed that juvenile bull trout selected the coldest water available in a plunge pool, 46 to 48 °F, within a temperature gradient of 46 to 60° F. In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003, pp. 899-900) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 75 percent) until maximum temperatures decline to 52 to 54 °F.

Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems throughout the Columbia River Basin. Factors that can influence bull trout ability to survive in warmer rivers include availability and proximity of cold water patches and food productivity. In the Little Lost River, Idaho, bull trout have been collected in water having temperatures up to 68 °F; however, the trend in the relationship between temperature and species composition shows that bull trout made up less than 50 percent of all salmonids when maximum summer water temperature exceeded 59 °F and less than 10 percent of all salmonids when temperature exceeded 63 °F (Garnett 1999, pp. 28-29).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools. Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns. Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover. These areas are sensitive to activities that directly or indirectly affect stream channel stability and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during the spawning period, and channel instability may decrease survival of eggs and alevins in the gravel from winter through spring. Increases in fine sediment can reduce egg survival and emergence.

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Preferred spawning habitat consists of low-gradient stream reaches with loose, clean gravel. Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater. Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992, p. 5), and after hatching, alevins remain in the substrate. Time from egg deposition to emergence of fry may surpass 200 days. Fry normally emerge from early April through May, depending on water temperatures and increasing stream flows.

Migratory forms of the bull trout appear to develop when habitat conditions allow movement between spawning and rearing streams and larger rivers or lakes where foraging opportunities may be enhanced (Frissell 1993, pp. 347-351). Benefits to migratory bull trout include greater growth in the more productive waters of larger streams and lakes, greater fecundity resulting in increased reproductive potential, and dispersing the population across space and time so that spawning streams may be recolonized should local populations suffer a catastrophic loss. In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbance makes local habitats temporarily unsuitable, the range of the species is diminished, and the potential for enhanced reproductive capabilities are lost (Rieman and McIntyre 1993, p. 11).

Additional information about the bull trout's habitat requirements can be found in the final listing rule (USFWS 1999).

F. Diet

Bull trout are opportunistic feeders, with food habits primarily a function of size and life history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macro zooplankton, mysids, and small fish. Adult migratory bull trout feed on various fish species. Fish growth depends on the quantity and quality of food that is eaten, and as fish grow, their foraging strategy changes in quantity, size, or other characteristics. Bull trout that are 110 millimeters (4.3 inches) long or longer commonly have fish in their diet (Shepard et al. 1984, p. 38), and bull trout of all sizes have been found to eat fish half their length (Beauchamp and Van Tassell 2001, p. 210).

Migration allows bull trout to move to or with a food source, access optimal foraging areas, and exploit a wider variety of prey resources. Migratory bull trout begin growing rapidly once they move to waters with abundant forage that includes fish (Shepard et al. 1984, p. 49). As these fish mature they become larger-bodied predators and are able to travel greater distances in search of prey species of larger size and in greater abundance. In Lake Billy Chinook, as bull trout became increasingly piscivorous with increasing size, the prey species changed from mainly smaller bull trout and rainbow trout for bull trout less than 17.7 inches in length to mainly kokanee for bull trout greater in size (Beauchamp and Van Tassell 2001, p. 213).

Additional information on the bull trout's diet can be found in the final listing rule (USFWS 1999).

G. Previously Consulted-on Effects

1. Rangewide

Consulted-on effects are effects that have been analyzed in section 7 consultations and reported in a biological opinion. In 2003, the Service reviewed all of the biological opinions issued by the Region 1 and Region 6 Service offices, from the time of bull trout listing until August 2003; this summed to 137 biological opinions. The Service completed section 7 consultations on many programs and actions that benefit bull trout. While some of the beneficial programs were small-scale actions such as removing passage barriers and installing 'fish friendly' crossing structures, some were large, such as restoring habitat conditions in degraded streams and riparian areas. Three consultations that had broad and long-term benefits to bull trout were consultations on documents that amended Forest Plans and provided standards and guidelines related to federally listed anadromous and native inland fish on National Forest Service lands in Idaho.

The majority of consultations on projects that resulted in adverse effects were for effects that were short-term and very local. Overall, our review showed that we consulted on a wide array of actions which had varying levels of effect and that none were found to appreciably reduce the likelihood of survival and recovery of the bull trout. Furthermore, no actions that have undergone consultation were anticipated to result in the loss of local populations of bull trout.

Between August 2003 and July 2006, the Service issued 198 opinions that included analyses of effects to the bull trout. These opinions also reached "not likely to jeopardize" determinations and the Service concluded that the continued long-term survival and existence of the species had not been appreciably reduced rangewide due to these actions. Since July 2006, a review of the data in our national Tracking and Integrated Logging System reveals only one opinion did not reach a "not likely to jeopardize" determination. This jeopardy opinion was issued to the Environmental Protection Agency (EPA) for Idaho water quality standards for numeric water quality criteria for toxic pollutants. The EPA is implementing the reasonable and prudent alternatives identified in the opinion to avoid jeopardizing the continued existence of the bull trout.

III. STATUS OF BULL TROUT DESIGNATED CRITICAL HABITAT

A. Legal Status

Ongoing litigation resulted in the U.S. District Court for the District of Oregon granting the Service a voluntary remand of the 2005 bull trout critical habitat designation. Subsequently, the Service published a final critical habitat designation for the coterminous United States population of the bull trout on October 18, 2010 (70 FR 63898); the rule became effective on November 17, 2010. A justification document was also developed to support the rule and is available on our website (<http://www.fws.gov/pacific/bulltrout>). The scope of the designation involved the species' coterminous range, which includes the Jarbidge River, Klamath River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments.

Rangewide, the Service designated reservoirs/lakes and stream/shoreline miles as bull trout critical habitat. Designated bull trout critical habitat is of two primary use types: 1) spawning and rearing, and 2) FMO. The 2010 revision increases the amount of designated bull trout critical habitat by approximately 76 percent for miles of stream/shoreline and by approximately 71 percent for acres of lakes and reservoirs compared to the 2005 designation.

This rule also identifies and designates as critical habitat approximately 1,323.7 km (822.5 miles) of streams/shorelines and 6,758.8 ha (16,701.3 acres) of lakes/reservoirs of unoccupied habitat to address bull trout conservation needs in specific geographic areas in several areas not occupied at the time of listing. No unoccupied habitat was included in the 2005 designation. These unoccupied areas were determined by the Service to be essential for restoring functioning migratory bull trout populations based on currently available scientific information. These unoccupied areas often include lower mainstem river environments that can provide seasonally important migration habitat for bull trout. This type of habitat is essential in areas where bull trout habitat and population loss over time necessitates reestablishing bull trout in currently unoccupied habitat areas to achieve recovery.

The final rule continues to exclude some critical habitat segments based on a careful balancing of the benefits of inclusion versus the benefits of exclusion. Critical habitat does not include: 1) waters adjacent to non-Federal lands covered by legally operative incidental take permits for HCPs issued under section 10(a)(1)(B) of the Act, in which bull trout is a covered species on or before the publication of this final rule; 2) waters within or adjacent to Tribal lands subject to certain commitments to conserve bull trout or a conservation program that provides aquatic resource protection and restoration through collaborative efforts, and where the Tribes indicated that inclusion would impair their relationship with the Service; or 3) waters where impacts to national security have been identified (75 FR 63898). Excluded areas are approximately 10 percent of the stream/shoreline miles and 4 percent of the lakes and reservoir acreage of designated critical habitat. Each excluded area is identified in the relevant Critical Habitat Unit (CHU) text, as identified in paragraphs (e)(8) through (e)(41) of the final rule. It is important to note that the exclusion of waterbodies from designated critical habitat does not negate or diminish their importance for bull trout conservation. Because exclusions reflect the often complex pattern of land ownership, designated critical habitat is often fragmented and interspersed with excluded stream segments.

B. Conservation Role and Description of Critical Habitat

The conservation role of bull trout critical habitat is to support viable core area populations (75 FR 63898:63943 [October 18, 2010]). The core areas reflect the metapopulation structure of bull trout and are the closest approximation of a biologically functioning unit for the purposes of recovery planning and risk analyses. CHUs generally encompass one or more core areas and may include FMO areas, outside of core areas, that are important to the survival and recovery of bull trout.

Thirty-two CHUs within the geographical area occupied by the species at the time of listing are designated under the final rule. Twenty-nine of the CHUs contain all of the physical or biological features identified in this final rule and support multiple life-history requirements. Three of the

mainstem river units in the Columbia and Snake River basins contain most of the physical or biological features necessary to support the bull trout's particular use of that habitat, other than those physical or biological features associated with breeding habitat.

The primary function of individual CHUs is to maintain and support core areas, which 1) contain bull trout populations with the demographic characteristics needed to ensure their persistence and contain the habitat needed to sustain those characteristics (Rieman and McIntyre 1993, p. 19); 2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (Rieman and McIntyre 1993, pp. 22-23; MBTSG 1998, pp. 48-49); 3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (Hard 1995, pp. 314-315; Healey and Prince 1995, p. 182; Rieman and McIntyre 1993, pp. 22-23; MBTSG 1998, pp. 48-49); and 4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations (Hard 1995, pp. 321-322; Rieman and McIntyre 1993, p. 23; Rieman and Allendorf 2001, p. 763; MBTSG 1998, pp. 13-16).

The Olympic Peninsula and Puget Sound CHUs are essential to the conservation of amphidromous bull trout, which are unique to the Coastal RU. These CHUs contain marine nearshore and freshwater habitats, outside of core areas, that are used by bull trout from one or more core areas. These habitats, outside of core areas, contain PBFs that are critical to adult and subadult foraging, overwintering, and migration.

Within the designated critical habitat areas, the PBFs for bull trout are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal, genetic exchange, or sheltering. Based on our current knowledge of the life history, biology, and ecology of this species and the characteristics of the habitat necessary to sustain its essential life-history functions, we have determined that the following PBFs are essential for the conservation of bull trout.

- (1) Springs, seeps, groundwater sources, and subsurface water connectivity (hyporeic flow) to contribute to water quality and quantity and provide thermal refugia.
- (2) Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
- (3) An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- (4) Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks, and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.
- (5) Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within

this range will depend on bull trout life history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; stream flow; and local groundwater influence.

(6) In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrate, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.

(7) A natural hydrograph, including peak, high, low, and baseflows within the historical and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.

(8) Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

(9) Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

The revised PBF's are similar to those previously in effect under the 2005 designation. The most significant modification is the addition of a ninth PBF to address the presence of nonnative predatory or competitive fish species. Although this PBF applies to both the freshwater and marine environments, currently no nonnative fish species are of concern in the marine environment, though this could change in the future.

Note that only PBFs 2, 3, 4, 5, and 8 apply to marine nearshore waters identified as critical habitat. Also, lakes and reservoirs within the CHUs also contain most of the physical or biological features necessary to support bull trout, with the exception of those associated with PBFs 1 and 6. Additionally, all except PBF 6 apply to FMO habitat designated as critical habitat.

Critical habitat includes the stream channels within the designated stream reaches and has a lateral extent as defined by the bankfull elevation on one bank to the bankfull elevation on the opposite bank. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge that generally has a recurrence interval of one to two years on the annual flood series. If bankfull elevation is not evident on either bank, the ordinary high-water line must be used to determine the lateral extent of critical habitat. The lateral extent of designated lakes is defined by the perimeter of the waterbody as mapped on standard 1:24,000 scale topographic maps. The Service assumes in many cases this is the full-pool level of the waterbody. In areas where only one side of the waterbody is designated (where only one side is excluded), the mid-line of the waterbody represents the lateral extent of critical habitat.

In marine nearshore areas, the inshore extent of critical habitat is the mean higher high-water (MHHW) line, including the uppermost reach of the saltwater wedge within tidally influenced freshwater heads of estuaries. The MHHW line refers to the average of all the higher high-water

heights of the two daily tidal levels. Marine critical habitat extends offshore to the depth of 10 meters (m) relative to the mean lower low-water (MLLW) line (zero tidal level or average of all the lower low-water heights of the two daily tidal levels). This area between the MHHW line and minus 10 m MLLW line (the average extent of the photic zone) is considered the habitat most consistently used by bull trout in marine waters based on known use, forage fish availability, and ongoing migration studies and captures geological and ecological processes important to maintaining these habitats. This area contains essential foraging habitat and migration corridors such as estuaries, bays, inlets, shallow subtidal areas, and intertidal flats.

Adjacent shoreline riparian areas, bluffs, and uplands are not designated as critical habitat. However, it should be recognized that the quality of marine and freshwater habitat along streams, lakes, and shorelines is intrinsically related to the character of these adjacent features and that human activities that occur outside of the designated critical habitat can have major effects on physical or biological features of the aquatic environment.

Activities that cause adverse effects to critical habitat are evaluated to determine if they are likely to "destroy or adversely modify" critical habitat by no longer serving the intended conservation role for the species or retaining those PBFs that relate to the ability of the area to at least periodically support the species. Activities that may destroy or adversely modify critical habitat are those that alter the PBFs to such an extent that the conservation value of critical habitat is appreciably reduced (75 FR 63898:63943; USFWS 2004, Vol. I. pp. 140-193, Vol. 2, pp. 69-114). The Service's evaluation must be conducted at the scale of the entire critical habitat area designated, unless otherwise stated in the final critical habitat rule (USFWS and NMFS 1998, pp. 4-39). Thus, adverse modification of bull trout critical habitat is evaluated at the scale of the final designation, which includes the critical habitat designated for the Klamath River, Jarbidge River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments. However, we consider all 32 CHUs to contain features or areas essential to the conservation of the bull trout (75 FR 63898:63901, 63944). Therefore, if a proposed action would alter the physical or biological features of critical habitat to an extent that appreciably reduces the conservation function of one or more critical habitat units for bull trout, a finding of adverse modification of the entire designated critical habitat area may be warranted (75 FR 63898:63943).

C. Current Critical Habitat Condition Rangewide

The condition of bull trout critical habitat varies across its range from poor to good. Although still relatively widely distributed across its historical range, the bull trout occurs in low numbers in many areas, and populations are considered depressed or declining across much of its range (67 FR 71240). This condition reflects the condition of bull trout habitat. The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, impoundments, dams, water diversions, and the introduction of nonnative species (63 FR 31647, June 10, 1998; 64 FR 17112, April 8, 1999).

There is widespread agreement in the scientific literature that many factors related to human activities have impacted bull trout and their habitat, and continue to do so. Among the many

factors that contribute to degraded PBFs, those which appear to be particularly significant and have resulted in a legacy of degraded habitat conditions are as follows: 1) fragmentation and isolation of local populations due to the proliferation of dams and water diversions that have eliminated habitat, altered water flow and temperature regimes, and impeded migratory movements (Dunham and Rieman 1999, p. 652; Rieman and McIntyre 1993, p. 7); 2) degradation of spawning and rearing habitat and upper watershed areas, particularly alterations in sedimentation rates and water temperature, resulting from forest and rangeland practices and intensive development of roads (Fraley and Shepard 1989, p. 141; MBTSG 1998, pp. ii-v, 20-45); 3) the introduction and spread of nonnative fish species, particularly brook trout and lake trout, as a result of fish stocking and degraded habitat conditions, which compete with bull trout for limited resources and, in the case of brook trout, hybridize with bull trout (Leary et al. 1993, p. 857; Rieman et al. 2006, pp. 73-76); 4) in the Coastal-Puget Sound region where amphidromous bull trout occur, degradation of mainstem river FMO habitat, and the degradation and loss of marine nearshore foraging and migration habitat due to urban and residential development; and 5) degradation of FMO habitat resulting from reduced prey base, roads, agriculture, development, and dams.

1. Effects of Climate Change on Bull Trout Critical Habitat

One objective of the final rule was to identify and protect those habitats that provide resiliency for bull trout use in the face of climate change. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features described in PBFs 1, 2, 3, 5, 7, 8, and 9. Protecting bull trout strongholds and cold water refugia from disturbance and ensuring connectivity among populations were important considerations in addressing this potential impact. Additionally, climate change may exacerbate habitat degradation impacts both physically (e.g., decreased base flows, increased water temperatures) and biologically (e.g., increased competition with nonnative fishes).

D. Previously Consulted-on Effects for Critical Habitat

1. Rangewide

The Service has formally consulted on the effects to bull trout critical habitat throughout its range. Section 7 consultations include actions that continue to degrade the environmental baseline. However, long-term restoration efforts have also been implemented that provide some improvement in the existing functions within some of the critical habitat units. Just one of the consulted-on actions has resulted in a destruction or adverse modification finding. This opinion was issued to the EPA for Idaho water quality standards for numeric water quality criteria for toxic pollutants. The EPA is implementing the reasonable and prudent alternatives (RPAs) identified in the opinion to avoid destroying or adversely modifying designated critical habitat for the bull trout.

IV. ENVIRONMENTAL BASELINE FOR BULL TROUT AND BULL TROUT DESIGNATED CRITICAL HABITAT

The preamble to the implementing regulations for section 7 (USFWS 1986) contemplates that the evaluation of “. . . the present environment in which the species or critical habitat exists, as well as the environment that will exist when the action is completed, in terms of the totality of factors affecting the species or critical habitat . . . will serve as the baseline for determining the effects of the action on the species or critical habitat”. The regulations at 50 CFR 402.02 define the environmental baseline to include “the past and present impacts of all Federal, State, or private actions and other human activities in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process.” The analysis presented in this section supplements the above *Status of the Species* evaluations by focusing on the current condition of the bull trout in the action area, the factors responsible for that condition, inclusive of the factors cited above in the regulatory definition of the environmental baseline, and the role the action area plays in the survival and recovery of the bull trout. Relevant factors on lands surrounding the action area that are influencing the condition of the bull trout were also considered in completing the status and baseline evaluations herein.

A. Status of Bull Trout in the Action Area

The action area occurs entirely within in the Upper Snake Recovery Unit, which encompasses portions of central Idaho, northern Nevada, and eastern Oregon, and includes the Salmon River, Malheur River, Jarbridge River, Little Lost River, Boise River, Payette River, and Weiser River drainages. There are 22 core areas in the Upper Snake Recovery Unit; the action area overlaps 10 of these core areas (USFWS 2015a, p. E1).

1. Arrowrock Core Area

The Arrowrock Core Area is located in the Boise River basin, in Elmore and Boise Counties. Arrowrock Dam on the Boise River is the lower extent of the core area and presents an impassable barrier to upstream fish movement. The core area is approximately 315,800 hectares (780,300 acres). The Boise NF manages 89 percent of the watershed. The core area contains fluvial bull trout that exhibit adfluvial characteristics and numerous resident bull trout populations. There are at least 18 local populations within the core area.

During 1996 through 1997, abundance of adult fluvial bull trout (i.e., fish greater than 300 millimeters [12 inches]) in Arrowrock Reservoir was estimated at 471 individuals. Current adult abundance is unknown. Population status and trend for local populations in most of this core area are currently unknown (USFWS 2015c, p. E99).

In the 2005 conservation status assessment (USFWS 2005) the Arrowrock Core Area final rank was "at risk". While not the most imperiled ("at high risk"), the core area was considered at risk because of the very limited and/or declining numbers, range, and/or habitat, making bull trout in the area vulnerable to extirpation. Threats to bull trout in the core area are considered moderate

to imminent. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall.

2. Anderson Ranch Core Area

Anderson Ranch Core Area is located in the Boise River basin, in Camas and Elmore Counties. Anderson Ranch Dam on the South Fork Boise River is the lower extent of the core area. The core area comprises approximately 257,700 hectares (636,970 acres). The dam has no provisions for either upstream or downstream fish passage, and blocks access of bull trout residing in the lower South Fork Boise River, North Fork Boise River, and Middle Fork Boise River to the upper portion of the South Fork Boise River basin. The Boise NF manages 85 percent of the watershed.

This core area has at least 11 local populations. The core area supports fluvial bull trout that exhibit adfluvial characteristics and numerous resident bull trout populations. Migratory bull trout abundance has been estimated in Anderson Ranch Reservoir. During 1999 through 2000, abundance of adult migratory bull trout in Anderson Ranch Reservoir was estimated at 368 individuals. Current Idaho Department of Fish and Game (IDFG) data indicates populations are increasing throughout the core area.

In the 2005 conservation status assessment (USFWS 2005) the Anderson Ranch Core Area final rank was "at risk". While not the most imperiled ("high risk"), the core area was considered at risk because of the very limited and/or declining numbers, range, and/or habitat, making bull trout in the area vulnerable to extirpation. Threats to bull trout in the core area are considered moderate and imminent. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall.

3. Squaw Creek Core Area

The Squaw Creek Core Area is located in the Payette River basin, in Gem, Boise, Washington, and Valley Counties. The Squaw Creek drainage joins the mainstem Payette River as part of the Black Canyon Reservoir. The core area is approximately 88,300 hectares (218,200 acres), with the Boise NF managing 47 percent of the watershed. There are at least four local populations in the core area. These populations exhibit resident life history expressions and occur only in the upper watersheds.

In the 2005 conservation status assessment (USFWS 2005) the Squaw Creek Core Area final rank was "high risk" because of extremely limited and/or rapidly declining numbers, range, and/or habitat, making bull trout in this core area highly vulnerable to extirpation. Threats to bull trout are considered imminent and of high severity throughout the core area. The bull trout 5-year review (USFWS 2008) also determined the core area to be "high risk" overall. Bull trout population status and trend are currently unknown (USFWS 2015c, p. E100).

4. North Fork Payette River Core Area

The North Fork Payette River Core Area is located in Valley County. The core area is approximately 159,900 hectares (395,150 acres) and is isolated upstream of Cascade Lake and a dam in the lower Gold Fork River. The U.S. Forest Service (Boise and Payette NFs) manages 47 percent of the watershed. The Gold Fork River is the only local population in this core area. Bull trout occur only in the upper watersheds and appear to be resident fish.

In the 2005 conservation status assessment (USFWS 2005) the North Fork Payette River Core Area final rank was "high risk" because of extremely limited and/or rapidly declining numbers, range, and/or habitat, making bull trout in this core area highly vulnerable to extirpation. Threats to bull trout are considered imminent and of high severity throughout the core area. The bull trout 5-year review (USFWS 2008) also determined the core area to be "high risk" overall. Bull trout population status and trend are currently unknown (USFWS 2015c, p. E101).

5. Middle Fork Payette River Core Area

The Middle Fork Payette River Core Area is located in Boise and Valley Counties. The core area is approximately 88,400 hectares (218,500 acres) and is predominately Federal lands. The U.S. Forest Service (Boise and Payette NFs) manages 95 percent of the watershed. There are three local populations in the core area. Bull trout in these local populations exhibit both resident and limited fluvial life history expressions.

In the 2005 conservation status assessment (USFWS 2005) the Middle Fork Payette River Core Area final rank was "at risk". While not the most imperiled ("high risk"), the core area was considered at risk because of the very limited and/or declining numbers, range, and/or habitat, making bull trout in the area vulnerable to extirpation. Threats to bull trout in the core area are considered moderate and imminent. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall. Bull trout population and trend are currently unknown (USFWS 2015c, p. E102).

6. Upper South Fork Payette River Core Area

The Upper South Fork Payette River Core Area is located in Boise and Valley Counties. The South Fork Payette River eventually becomes the Payette River from its confluence with the North Fork Payette River. The core area is approximately 173,700 hectares (429,200 acres) and is predominately Federal lands. The U.S. Forest Service (Boise and Sawtooth NFs) manages 95 percent of the watershed while private lands account for 1 percent. There are 11 local populations in this core area. Bull trout in these local populations exhibit resident and limited fluvial life history expressions.

In the 2005 conservation status assessment (USFWS 2005) the Upper South Fork Payette River Core Area final rank was "at risk". While not the most imperiled ("high risk"), the core area was considered at risk because of the very limited and/or declining numbers, range, and/or habitat, making bull trout in the area vulnerable to extirpation. Threats to bull trout in the core area are considered moderate and imminent. The bull trout 5-year review (USFWS 2008) also determined

the core area to be "at risk" overall. Bull trout population and trend are currently unknown (USFWS 2015c, p. E104).

7. Deadwood River Core Area

The Deadwood River Core Area is located in Valley County. The Deadwood River drainage eventually joins the Upper South Fork Payette River. Deadwood Dam created Deadwood Reservoir and forms an impassible barrier to fish movement. Bull trout in the upper Deadwood River and Deadwood Reservoir are isolated from fish in the lower Deadwood River and the South Fork Payette River watersheds. The core area is approximately 28,400 hectares (70,200 acres). The U.S. Forest Service (Boise and Payette NFs) manages 92 percent of the watershed. There are at least six local populations in this core area. Bull trout populations exhibit both resident and limited fluvial life history expressions.

In the 2005 conservation status assessment (USFWS 2005) the Deadwood River Core Area final rank was "high risk" because of extremely limited and/or rapidly declining numbers, range, and/or habitat, making bull trout in this core area highly vulnerable to extirpation. Threats to bull trout are considered imminent and of high severity throughout the core area. The bull trout 5-year review (USFWS 2008) also determined the core area to be "high risk" overall. Bull trout population status and trend are currently unknown (USFWS 2015c, p. E103).

8. Upper Salmon River Core Area

The Upper Salmon River Core Area is located in Custer County and extends from the mouth of the Pahsimeroi River to the headwaters in the Sawtooth Mountains, including the mainstem Salmon River and tributaries. The area covers 6,242 square kilometers (2,410 square miles) and contains 5,230 kilometers (3,251 miles) of streams. Eighty-nine percent of this core area is in public ownership, with the U.S. Forest Service (Boise, Sawtooth, and Salmon-Challis NFs) managing almost all of the land. There are at least 18 local populations in this core area. Both resident and migratory (fluvial and adfluvial) bull trout are present in all or nearly all local populations in this core area.

In the 2005 conservation status assessment (USFWS 2005) the Upper Salmon River Core Area final rank was "potential risk" because of limited and/or declining numbers, range, and/or habitat, even though bull trout may be locally abundant in some portions of the core area. The core area is apparently not vulnerable to extirpation at this time, but may be cause for long-term concern. The bull trout 5-year review (USFWS 2008) also determined the core area to be "potential risk" overall. The bull trout recovery plan (USFWS 2015a) indicates that bull trout population status and trend are currently increasing.

9. Middle Fork Salmon River Core Area

The Middle Fork Salmon River Core Area includes the entire Middle Fork Salmon River drainage which lies in Idaho, Valley, Custer, and Lemhi Counties and is mostly within the Frank Church River of No Return Wilderness. This area encompasses 744,300 hectares (1,839,000

acres) and 99 percent of this area is managed by the U.S. Forest Service (Boise, Payette, and Salmon-Challis NFs).

There are at least 28 local populations in this core area. IDFG estimates that this core area contains some of the strongest bull trout local populations in the Pacific Northwest. The bull trout recovery plan indicates bull trout populations are stable (USFWS 2015c, p. E91).

In the 2005 conservation status assessment (USFWS 2005) the Middle Fork Salmon River Core Area final rank was "low risk" because bull trout are common or uncommon (but not rare), and widespread through the core area. The core area is apparently not vulnerable to extirpation at this time, but may be cause for long-term concern. The bull trout 5-year review (USFWS 2008) also determined the core area to be "low risk" overall.

10. South Fork Salmon River Core Area

The South Fork Salmon River Core Area occurs in Valley and Idaho Counties and is 338,100 acres (835,000 hectares) in size. The U.S. Forest Service (Boise and Payette NFs) manages 99 percent of the land in this core area. There are at least 28 local populations in this core area. Both resident and fluvial populations of bull trout have been documented in the core area

In the 2005 conservation status assessment (USFWS 2005) the South Fork Salmon River Core Area final rank was "at risk". While not the most imperiled ("high risk"), the core area was considered at risk because of the very limited and/or declining numbers, range, and/or habitat, making bull trout in the area vulnerable to extirpation. Threats to bull trout in the core area are considered moderate and imminent. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall. Bull trout population status and trend are currently increasing (USFWS 2015c, p. E89).

Establishment of Baseline Conditions for Bull Trout

The survival and recovery needs of the bull trout can be described generally as cold stream temperatures, clean water quality, complex channel characteristics, and large patches of habitat that are well connected. Therefore, to determine the overall effect of a proposed action on the bull trout for purposes of a jeopardy analysis, it is logical to try and ascertain how, and to what extent, those basic needs are likely to be impacted by a proposed action. But first, a baseline condition, inclusive of conditions in the action area, of those habitat parameters needs to be described to form the context for evaluating the potential impacts of the proposed action on bull trout.

Appendix 9 in *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (Lee et al. 1997), commonly referred to as the "Matrix of Pathways and Indicators", identifies the important elements or indicators of bull trout habitat. Using this table assists in consistent organization and assessment of current conditions and in judging how those indicators may be impacted by a proposed action (Lee et al. 1997, p. 9-6). The Forests included a general matrix analysis for each subbasin in the action area in the Assessment (Appendix G., pp. 6, 9, 12, 15,

18, 21, 26, 38, 42, 47, 49, 51 and 53). These are summarized in Table 5 below where the number indicates the cumulative subwatersheds in the action area where the level of function is known.

Table 5. Baseline condition for select physical indicators (where known) of subwatersheds in the action area

Indicator	Functioning Appropriate Condition	Functioning at Risk Condition	Functioning at an Unacceptable Risk Condition
Local Population	41	43	195
Growth and Survival	24	136	116
Sediment/Turbidity/Substrate Embeddedness	50	157	76
Chemical Contamination/Nutrients	198	62	10
Riparian Conservation Areas	45	183	45

Description of Baseline Conditions

Salmon River populations and habitat conditions appear to be functioning better than those in the Payette and Boise Rivers. Livestock grazing and water diversions are common impacts associated with the action area. Impacts from historic mining and logging activities are considerable within some core areas. Effects from private development are also considerable in some core areas.

Currently 157,000 acres of inventoried invasive plant species infestations in over 25,981 locations are known to occur in the 4.3 million acres of lands administered by the Forests. In the Assessment, invasive plant infestations are indicated as a factor influencing watershed conditions. Approximately 68% of the existing invasive noxious plant infestations are located in four subbasins within the Middle Snake River. This includes the North and Middle Forks of the Boise (26.4%), Boise-Mores (18%), South Fork Boise (13.3%) and South Fork Payette Basins (10.3%). Invasive plant infestations in the action area are only one variable affecting the population of bull trout. Other variables and circumstances appear to play a larger cumulative role in bull trout population status.

B. Status of Bull Trout Designated Critical Habitat in the Action Area

The action area falls within the Upper Snake Recovery Unit (USFWS 2015c, p. E1). Portions of the action area overlap two of the 32 critical habitat units (CHUs) throughout the range of the bull trout, the Salmon River Basin CHU and the Southwest Idaho River Basin CHU (75 FR 63935).

1. Southwest Idaho River Basin Critical Habitat Unit

The Southwest Idaho River Basin CHU occurs in southwestern Idaho and consists of three river basins: the Boise River, Payette River, and Weiser River. The Southwest Idaho River Basin CHU includes approximately 2,149.6 km (1,336.0 mi) of streams and 4,310.5 ha (10,651.5 ac) of lake and reservoir surface area designated as critical habitat. This CHU contains adfluvial, fluvial, and resident populations of bull trout. Large adfluvial and fluvial populations of bull trout occur within the Boise and Payette River systems. The populations that exhibit adfluvial life history expressions may be the largest in the Upper Snake River Recovery Unit.

This CHU includes eight critical habitat sub-units (CHSU), seven of which are in the action area: Anderson Ranch, Arrowrock, Upper South Fork Payette River, Deadwood River, Middle Fork Payette River, North Fork Payette River, and Squaw Creek. At least a portion of all CHSUs, except the Weiser River CHSU, is included within the proposed action (USFWS 2010, p. 613).

The Anderson Ranch CHSU supports populations exhibiting rare adfluvial life history expressions, a moderate number of local populations, moderate numbers of individuals, a moderate amount of habitat, and few threats. Designated critical habitat in the CHSU includes Anderson Ranch Reservoir (1,862.0 ha; (4,601.0 ac)) and approximately 443.4 km (275.5 mi) of streams (USFWS 2010, p. 659).

The Arrowrock CHSU supports populations exhibiting rare adfluvial life history expressions, a moderate number of local populations, large numbers of individuals, a moderate amount of habitat, and few threats. Designated critical habitat includes approximately 720.0 km (447.4 mi) of streams and 1,252.0 ha (3,093.7 ac) of reservoir surface area (USFWS 2010, p. 645).

The Upper South Fork Payette River CHSU contains populations exhibiting both fluvial and resident life history expressions and a high number of individuals. The resident populations may possibly have unique genetic diversity. Designated critical habitat in the CHSU includes approximately 447.4 km (278.0 mi) of streams (USFWS 2010, p. 629).

The Deadwood River CHSU supports a rare adfluvial life history expression in the Upper Snake Recovery Unit. It contains a moderate number of adults. Designated critical habitat in the CHSU includes approximately 123.9 km (77.0 mi) of streams and 1,197.0 ha (2,957.8 ac) of reservoir surface area (USFWS 2010, p. 641).

The Middle Fork Payette River CHSU may possibly support resident populations with unique genetic diversity. This CHSU contains populations that exhibit both fluvial and resident life history expressions. Designated critical habitat in the CHSU includes approximately 197.6 km (122.7 mi) of streams (USFWS 2010, p. 625).

The North Fork Payette River CHSU may possibly support resident populations with unique genetic diversity. Designated critical habitat in the CHSU includes approximately 31.1 km (19.3 mi) of streams (USFWS 2010, p. 621).

The Squaw Creek CHSU may possibly support resident populations with unique genetic diversity. Designated critical habitat in the CHSU includes approximately 72.3 km (44.9 mi) of streams (USFWS 2010, p. 617).

2. Salmon River Basin Critical Habitat Unit

The Salmon River Basin CHU encompasses the entire Salmon River basin, extending from the Idaho–Montana border to the Oregon–Idaho border before entering the Snake River. This CHU is the largest CHU of the Upper Snake Recovery Unit and includes 7,376.4 km (4,583.5 mi) of stream and 1,683.7 ha (4,160.6 ac) of lake and reservoir surface area designated as critical habitat (USFWS 2010, p. 673). This CHU contains the largest populations of bull trout in this

Recovery Unit. It supports populations with adfluvial, fluvial, and resident life history expression. Migratory life history expression is needed for the long-term conservation of the species, while some resident populations may also contain unique genes that promote persistence from specific threats. This CHU is comprised of 10 CHSUs. The action area overlaps two of these CHSUs, South Fork Salmon River and Middle Fork Salmon River. Large portions of this CHU occur within the Frank Church-River of No Return Wilderness.

The South Fork Salmon River CHSU contains many individuals, a moderate amount of habitat, and few threats. This CHSU supports populations that exhibit resident and fluvial life history expressions. Designated critical habitat in this CHSU includes 1,220.5 km (758.4 mi) of streams and 259.0 ha (640.0 ac) of lake surface area (USFWS 2010, p. 679).

The Middle Fork Salmon River CHSU contains the largest number of local populations, a high number of individuals, a large amount of habitat, and few threats. Bull trout populations in this CHSU exhibit both resident and fluvial life history forms. Designated critical habitat in this CHSU includes 2,045.7 km (1,271.1 mi) of streams and 90.9 ha (224.6 ac) of lake surface area (USFWS 2010, p. 715).

Physical or biological features (PBFs) are used to describe habitat features that are essential to the conservation of the bull trout. Table 6 below displays the PBFs and associated diagnostic pathway/indicators that relate to each PBF. The baseline conditions of the diagnostic pathway/indicators were presented above in Table 5.

Table 6. Pathways and Indicators PBF (PCE) cross walk

Diagnostic Pathway/Indicator	PCE 1 - Springs, seeps, groundwater	PCE 2 - Migratory Habitats	PCE 3 - Abundant food base	PCE 4 - Complex habitats	PCE 5 - Water Temperature	PCE 6 - Substrate features	PCE 7 - Natural Hydrograph	PCE 8 - Water quality and quantity	PCE 9 - Predators and competitors
Water Quality									
Temperature		x	x		x			x	
Sediment		x	x			x		x	
Chemical Contaminants and Nutrients	x	x	x					x	
Habitat Access									
Physical Barriers	x	x	x						x
Habitat Elements									
Substrate Embeddedness	x		x			x			
Large Woody Debris				x		x			
Pool Frequency and Quality			x	x		x			
Large Pools				x	x				
Off-Channel Habitat				x					
Refugia		x			x				x
Channel Conditions and Dynamics									
Wetted Width/Maximum Depth Ratio		x		x	x				
Streambank Condition	x			x	x	x			
Floodplain Connectivity	x		x	x	x		x	x	
Flow/Hydrology									
Changes in Peak/Base Flows	x	x			x		x	x	
Drainage Network Increase	x						x	x	
Watershed Conditions									
Road Density and Location	x				x		x		
Disturbance History				x			x	x	x
Riparian Conservation Areas	x		x	x	x		x		
Disturbance Regime				x			x	x	

Factors affecting the environmental baseline of bull trout critical habitat in the action area are similar to those described for bull trout populations and habitat in the action area. In summary,

the baseline as presented in Table 5 indicates that most pathways in most subbasins are functioning at risk. The only pathway functioning appropriately is the chemical contamination/nutrient pathway for a majority of subbasins the action area. Condition of PBFs relies on the condition of the associated indicators.

V. EFFECTS OF THE PROPOSED ACTION

A. Direct and Indirect Effects of the Proposed Action

The implementing regulations for section 7 define “effects of the action” as “the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, which will be added to the environmental baseline” (USFWS 1986, p. 19958). “Indirect effects” are caused by or result from the agency action, are later in time, but are still reasonably certain to occur (USFWS 1986, p. 19958).

Near-stream activities associated with all treatment elements of the proposed action have the potential to displace bull trout in the action area. However, the effects to bull trout would be minimal because disturbance would be localized, as well as limited in duration, and any fish present would be able to easily move into other suitable habitat. Potential displacement is likely to be of short duration and unlikely to interfere with normal feeding, breeding, or sheltering behavior of bull trout. Therefore, effects to bull trout from disturbance are considered insignificant.

1. Rehabilitation and Restoration

Direct ground disturbances associated with the Project would occur during rehabilitation and restoration activities. These activities are unlikely to contribute sediment into streams or lakes because design criteria limits these activities to slopes less than 45 percent and in areas where landtype erosion hazard ratings are low or moderate (Assessment, p. 48; Proposed Action, p. 18). Riparian areas with invasive plant infestations would likely be experiencing increased erosion as a result of the infestations. Additional ground disturbances related to rehabilitation and restoration activities within riparian areas would likely have minimal additional effects on erosion or water quality because of the design criteria that limits potential for erosion.

Rehabilitation and restoration activities within riparian areas are expected to have a minimal effect on existing riparian vegetation because these activities would only occur where invasive plant infestations have already replaced most or all native vegetation. Effects to bull trout and its designated critical habitat from rehabilitation and restoration activities are considered insignificant in the short term, and may be beneficial in the long term.

2. Monitoring and Early Detection and Rapid Response (EDRR)

The need to monitor current conditions and effectiveness of treatments is an integral part of any adaptive IWM program. Monitoring helps address EDRR and treatment, informing future decision-making and strategy. These activities require time spent around bull trout habitat. Monitoring and EDRR activities within bull trout riparian areas are expected to have a minimal

effect on riparian vegetation because of the short duration of human presence in these areas. Effects to bull trout from disturbance were discussed above. For the above reasons, effects to bull trout and its designated critical habitat from monitoring and EDRR activities are considered insignificant (Proposed Action, p. 16).

3. Mechanical and Manual Control

Mechanical and manual control methods may result in a short-term increase in the amount of bare ground where this treatment occurs. The Forests indicate that commonly, dead plant material from plants that were mechanically or manually removed breaks down and covers the soil surface, providing a protective litter layer. However, where this does not occur, increased amounts of bare ground could result in a temporary increase in soil erosion. Because mechanical and manual control can only be effectively used for small infestations, any impacts would be highly localized and limited in extent. Because design criteria for mechanical and manual control methods will greatly reduce potential treatment-related erosion, the effects to bull trout and its designated critical habitat from mechanical and manual control are considered insignificant in the short term, and may be beneficial in the long term.

4. Biological Control

Biological control methods (plant predators or pathogens) used to control invasive plants are expected to have no adverse effect on bull trout or its designated critical habitat. Because there are no biological control agents proposed for use on the Forests that are known to attack non-target plants, no negative effects to native riparian vegetation or riparian function is expected. Biological control methods would not affect sediment loads in streams or lakes because ground-disturbing activities would not occur with this treatment method and native vegetation would not be impacted. Additionally, the biological control agents proposed for use would not compete for food with aquatic organisms. Some plant predators (insects) proposed for use may provide an incidental food source for fish where infestations occur near streams.

5. Herbicide Control

Herbicide control treatments may result in the exposure of bare ground following invasive plant removal. This may result in an increase in localized, short term soil erosion. Increased sediment delivery to streams or lakes would be minimal because no large scale removal of plants would take place within the riparian zone. Broadcast application would not occur within 100 feet of water and aerial application would not occur within 300 feet of water. Spot spraying and hand select methods would be used to target an individual plant or small infestation, and would not result in large areas of bare ground or impacts to non-target native vegetation. Sufficient vegetation is expected to remain in riparian areas to reduce potential treatment-related sediment effects to streams or lakes. Therefore, effects to bull trout and its designated critical habitat from increased sediment input to streams caused by chemical control treatments are considered insignificant.

Herbicide control methods are more likely to result in potential toxicological effects to bull trout as a result of water contamination, rather than physical changes to fish habitat. The effects of

herbicides to bull trout and its designated critical habitat depend on many factors, including toxicity of an herbicide to bull trout, and level, or likelihood, of exposure. The toxicological effects and ecological risks to bull trout are not fully known for all herbicides, formulations, and adjuvants in the proposed action. Similarly, a quantitative estimate of exposure of bull trout to herbicides is not possible. Exact treatment locations and amounts of chemicals to be applied each year are not definitively known. Given the incomplete information available, we rely on extrapolation or inference from published studies of similar chemicals on surrogate fish species. Because there is uncertainty regarding the effects of many herbicides, most probable outcomes, as well as worst-case scenarios, were considered to ensure the analysis errs in favor of the listed species (Assessment, pp. 74, 83, 97).

Effects to fish from herbicides include the following toxicological endpoints:

- direct mortality at any life stage;
- increase or decrease in growth;
- changes in reproductive behavior;
- reduction in the number of eggs produced, fertilized, or hatched;
- developmental abnormalities, including behavioral deficits or physical deformities;
- reduced ability to osmoregulate or adapt to salinity gradients;
- reduced ability to tolerate shifts in environmental variables (e.g., temperature or increased stress);
- increased susceptibility to disease;
- increased susceptibility to predation; and,
- changes in migratory behavior.

These endpoints are generally considered to be important for the fitness of salmonids and other fish species. The ecological significance of sublethal effects depends on the degree to which they influence the survival and reproductive potential of individual fish, and the viability and genetic integrity of wild populations.

Effects to bull trout can also result from the effects of herbicides on nontarget species and the aquatic environment. The likelihood of adverse indirect effects is dependent on environmental concentrations, bioavailability of the chemical, and persistence of the herbicide in bull trout habitat. For most herbicides, including chemicals covered in the Proposed Action, there is minimal information available on specific impacts, such as negative effects to primary production, nutrient dynamics, or the trophic structure of macroinvertebrate communities. Most available information on potential environmental effects must be inferred from laboratory assays; however, a few observations of environmental effects are reported in the literature. Due to the shortage of information, there are uncertainties associated with the following factors: (1) the fate of herbicides in streams; (2) the resiliency and recovery of aquatic communities; (3) the site specific foraging habits of bull trout and the vulnerability of key prey species; (4) the effects of herbicide mixtures that include adjuvants or other ingredients that may affect species differently than the active ingredient; and, (5) the mitigating or exacerbating effects of local environmental conditions.

The effects of contaminants on ecosystem function are important in determining a chemical's cumulative risk to aquatic organisms (Preston 2002). Additionally, organisms synonymous with bull trout habitat such as aquatic plants and macroinvertebrates are generally more sensitive than fish to the acutely toxic effects of herbicides. Therefore, chemicals can impact the structure of aquatic ecosystems at concentrations that fall below those expected to result in direct impairment to bull trout. Because the integrity of the aquatic food chain is an essential biological requirement for bull trout, the possibility that herbicide applications will affect productivity of stream or lakes is an unknown level of impact of the proposed action.

The potential effect of herbicides on prey species of bull trout is also an important concern. Bull trout are opportunistic feeders and prey on terrestrial and aquatic insects, macro zooplankton, mysids, and small fish. Generally, insects and crustaceans are more acutely sensitive to toxic effects of environmental contaminants than fish or other vertebrates. However, with the exception of *Daphnia*, the impacts of herbicides on bull trout prey taxa have not been widely investigated.

The risk assessments referred to in the Assessment (p. 14) determined the level of concern for each herbicide using the surrogate rainbow trout and a food source, *Daphnia*. Effects to rainbow trout can be representative of potential effects to other salmonids including bull trout, while effects to *Daphnia* can be representative of potential impacts to a food source of freshwater fishes. Most of the herbicides proposed for use in the Proposed Action are reported as having no toxicity or low levels of toxicity to rainbow trout; glyphosate, picloram, and sulfometuron methyl are reported as having a moderate level of concern (Assessment, pp. 89-90).

A slight level of concern to *Daphnia* is reported for aminopyralid, glyphosate, and picloram. All other herbicides proposed for use are reported as having no level of concern to *Daphnia* (Assessment, pp. 79-80). Picloram is the chemical associated with greatest risk given its persistence, mobility, and toxicity. Thus, picloram would not be used closer than 50 feet from streams. In contrast, aminopyralid, which is effective on some of the same target plants as picloram, poses relatively low risk to aquatic resources and may be used closer to surface waters. Glyphosate (Roundup) is a concern for fish and invertebrates at the upper limits, but not at central limits. It does not persist in the environment due to the fact that it readily binds to organic matter in soil and is easily broken down by microorganisms. Roundup (no surfactants) would not be used closer than 15 feet of open water for spot or hand selective applications. Although EPA classifies fluroxypyr as practically non-toxic to fish and invertebrates such as *Daphnia*, the analysis shows that fluroxypyr has a potential to impact invertebrates. For this reason fluroxypyr will not be used closer than 50 feet from live water (Assessment, pp. 74-75).

The proposed action includes numerous mandatory design criteria and BMPs to avoid or minimize water contamination from herbicides (Proposed Action, pp. 1, 8-10, Appendix A). These criteria include stream and riparian buffers where chemical use is restricted or prohibited by limiting the application method, and amount and type of herbicide that may be used. The likelihood of herbicide entering the water depends of the mechanism of entry and the method of herbicide application. Mechanisms of potential entry of herbicides to aquatic ecosystems during ground-based or aerial treatment of terrestrial weeds include direct application, wind drift, surface runoff and leaching through soils, and accidental spills.

Direct Application

Direct application of herbicide to water using ground-based spot and broadcast treatment under the proposed action is very unlikely to occur. Most invasive plant treatments would occur a considerable distance from water making runoff into water unlikely. For focused spot treatments within riparian areas, design criteria require buffer widths of 15 feet from all water for herbicides identified as low risk. Some herbicides labeled for aquatic use, such as aquatic 2,4-D amine and aquatic glyphosate, could be applied up to the ordinary high water mark using hand selective methods (wicking, wiping, etc. on individual plants). For those herbicides identified as moderate or high risk, only focused spot applications would be permitted within 50 feet (100 feet for glyphosate) of flowing water and ponded water, allowing precise treatment of target plants only and leaving a minimal chance of herbicide being applied directly to nearby bodies of water. Design criteria require that no broadcast application occur within 100 feet of water. Implementation of the design criteria and BMPs limits the likelihood of direct application of herbicides into water. Water contamination with herbicide via this exposure pathway is unlikely to occur resulting in discountable effects to bull trout and its designated critical habitat.

Direct aerial application of herbicides into streams and lakes could occur only if design criteria and BMPs are not adhered to. The Forest has specified that design criteria are mandatory. Design criteria require that all live water (perennial streams, flowing intermittent streams, lakes, ponds, springs, and wetlands) have a 300 foot no aerial application buffer. The buffer would be identified prior to aerial application of herbicide. A GPS system would be used in spray helicopters and each treatment unit mapped prior to flight to ensure that only areas marked for treatment are treated. The areas where herbicide had been applied would be apparent because of the dyes added to the herbicides. Additionally, constant communication would be maintained between the helicopter and the project leader during spraying operations, and ground observers in various locations would visually monitor deposition of herbicide.

Appendix C of the Proposed Action details herbicide application guidelines near water for the action area, including buffer widths by application method. Label requirements would be followed, and applications would only be performed by or under the direct supervision of licensed Idaho professional herbicide applicators, providing a high level of assurance that herbicides would be applied correctly. Because of the design criteria and BMPs required to be implemented as part of the Project, the Service expects direct aerial application of herbicide to streams and lakes is unlikely to occur, and would therefore result in discountable effects to bull trout and its designated critical habitat.

Wind Drift

Broadcast and ground-based spot application can move herbicides through the atmosphere as wind drift, which occurs during herbicide application, and volatilization (i.e., the passing off of vapor), which occurs after application. Wind drift is the movement of the herbicide, generally via spray droplets, from the target area to an unintended area; it is dependent on sprayer parameters such as nozzle orifice size and boom height and pressure; wind speed and direction; presence of inversions; and interception by vegetation. Volatilization is dependent on the physical properties of the herbicide, primarily vapor pressure, and climate conditions promoting evaporation of the

carrier. Even under the most extreme heat and low humidity, volatilization is unlikely to be a significant cause of wind drift (Assessment, p. 55).

During ground application, risk of contamination by wind drift is largely dependent on droplet size, elevation of the spray nozzle, wind speed, and weather conditions (heat and humidity) that can cause the water droplets to evaporate, leaving the chemicals suspended in the air (Rashin and Graber 1993). During periods when there is little to no wind, minimal vertical air mixing occurs, and herbicide particles can remain suspended for long periods of time, potentially traveling long distances. This circumstance is not likely to occur in mountainous regions including the Boise and Sawtooth NFs, due to daily convective cycles that heat the air and generate winds during the day. Convective winds occur daily, except under heavy cloud cover associated with risk of precipitation; consequently, periods without any wind are rare during the spraying season when design criteria are met.

Risk of contamination from wind drift during ground-based application of herbicides is less than during aerial application because application occurs more slowly and applicators can quickly recognize any application problems and adjust their application techniques. Spot-spraying is the only ground-based application technique that would be used in riparian areas, and use of directional application techniques to direct herbicide away from water is required. Further, applicators are required to monitor wind speed and direction, and equipment and spray parameters, throughout an herbicide application. No herbicide would be applied in sustained wind conditions of 5 mph in riparian areas or in any wind conditions exceeding product label directions. Applicators are required to obtain a weather forecast daily for the area prior to initiating a spraying project to ensure no extreme precipitation or wind events are predicted to occur during or immediately after spraying. Because of the implementation of design criteria and BMPs, herbicide reaching the water via this exposure pathway is unlikely to occur resulting in discountable effects to bull trout and its designated critical habitat.

The greatest potential for drift to occur under the proposed action is during aerial applications. However, drift from aerial applications is unlikely to enter surface water, primarily because of the 300-foot buffer widths on all live water and other design criteria such as no aerial herbicide treatments when sustained wind speeds exceed 5 mph or in any wind conditions exceeding product label directions, whichever is less; no aerial herbicide treatments during inversions, below minimum relative humidity, or above maximum temperature, as stated on the label; and requirement to obtain a weather forecast for the area prior to initiating a spraying project to ensure no precipitation or wind events are predicted to occur during or immediately after spraying that could allow runoff or drift into waterbodies. Under these conditions, it is very unlikely that drift would reach surface water. In the unlikely event that drift does occur into the 300-foot buffer, monitoring using spray cards within 300 feet of perennial streams or other waterbodies would detect the herbicide, allowing applicators to modify practices and prevent any additional impacts. Monitoring procedures (Proposed Action, Appendix B and J) identify where and how drift cards are placed near waterbodies and how drift card locations and mapped buffer locations will be digitized using GPS technology and provided to pilots to ensure that only marked areas are actually treated. Additionally, the monitoring protocol specifies how personnel will monitor weather conditions, handle drift cards, and determine and report any drift detection (Assessment, 57).

The design criteria address several of the most important factors to minimize drift, including: (1) a required 300 foot buffer around live water; (2) use of larger droplet size to the extent possible; and, (3) applying herbicide only in appropriate weather conditions, considering wind speed and direction, inversions, relative humidity and temperatures (Rashin and Graber 1993). The Service finds water contamination with herbicide via this exposure pathway is unlikely to occur resulting in discountable effects to bull trout and its designated critical habitat.

Mobilization in Ephemeral Streams and Channels

Although potential for mobilization of herbicide in ephemeral streams and channels (those channels that flow only in response to rainfall events) during subsequent runoff events would be minimized under the proposed action, broadcast application of both “moderately toxic-to-fish” and “moderate and high risk to aquatic organisms” herbicide could be applied to dry ephemeral upland channels or upland roadside ditches that have no standing or flowing water. Ground-based spot applications using the same level of risk herbicides could be applied in areas within the 100 foot bull trout buffer zones, but would target specific plants through direct application. Ground-based broadcast applications would not occur within the 100 foot buffers on perennial and intermittent streams or along roadside ditches with standing or flowing water.

Herbicide uptake by plants, as well as ultraviolet and microbial breakdown of herbicides applied, would in many cases limit the amount of herbicide that could be mobilized by the first runoff event following application. This is further discussed in the “Overland Flow and Leaching” section below. Design criteria requiring the monitoring of weather forecasts to ensure no precipitation event is occurring or is imminent (within 24 hours of application) would minimize the only scenario in which herbicide could mobilize in ephemeral stream channels. The Service expects that herbicide mobilizing in upland ephemeral streams and traveling into 100 foot buffers through ground-based application could occur in the event that a unpredicted rain event were to take place within 24 hours of application. This pathway may increase herbicide in 100 foot buffers by combining herbicide applied in upland areas with herbicide applied in adjacent 100 foot buffers. This accumulation of herbicide in 100 foot buffers increases the likelihood and toxicity of herbicide reaching bull trout waters in large enough quantities to result in adverse effects to bull trout and designated critical habitat PBF 3 (food base) and 8 (water quality).

Aerial application of herbicide would not occur within riparian zones or within 300 feet of any live water. However, aerial application of “moderately toxic-to-fish” and “moderate and high risk to aquatic organisms” herbicide could occur on ephemeral or intermittent stream channels that do not have flowing water at the time and do not have defined riparian vegetation. In this situation, herbicide could potentially be mobilized during the first runoff event following application, depending on the persistence and other properties of the herbicide. The Service expects that herbicide mobilizing in upland ephemeral streams and traveling into 100 foot buffers through aerial application could occur in the event that a unpredicted rain event were to take place within 24 hours of application. This pathway may increase herbicide in 100 foot buffers by combining herbicide applied in upland areas with herbicide directly applied in adjacent 100 foot buffers. The combination of herbicide in 100 foot buffers increases the likelihood and toxicity of herbicide reaching bull trout waters in large enough quantities to result

in adverse effects to bull trout and designated critical habitat PBFs 3 (food base) and 8 (water quality).

Overland Flow and Leaching

Overland flow and leaching are the most likely mechanism for “moderately toxic-to-fish” and “moderate and high risk to aquatic organisms” herbicides to reach surface water under the proposed action. Overland flow occurs when the rate of precipitation or snowmelt exceeds the rate of infiltration. Ground-based spot applications could be applied in areas within bull trout buffer zones, but would target specific plants through direct application. Ground-based broadcast applications would result in some application of moderately toxic-to-fish herbicide directly to the ground, but the extent would be limited by size of treatment area and vegetation cover. Design criteria, BMPs, and label requirements would help ensure maximum efficiency of herbicide applications and would reduce the potential for herbicide to reach surface water.

Aerial herbicide applications are capable of covering large areas with uniform coverage of herbicide. This is the most likely mechanism for herbicides to reach surface water under the proposed action due to the variable scale of application. Rainfall can mobilize herbicide applied to plants or soil, depending on the herbicide properties. Factors affecting herbicide movement through runoff or leaching include physical properties of the herbicide (i.e., persistence in the environment, water solubility, movement in soil) and environmental conditions (i.e., soil type, distance to a waterbody, timing of precipitation following herbicide application). Contaminants can be filtered out of water to varying degrees by sorption onto plants, debris, and soils encountered in the flow path. In general, the amount of filtering increases with the distance from the treated area to the nearest water. The potential concentration of herbicide reaching surface waters or groundwater is not known, and depends on the applied concentration and the degree of filtering that occurs in the distance the herbicide travels before reaching water.

Because of the variety of processes influencing overland flow discussed above, the mobility of herbicide after aerial treatment will vary greatly with the herbicide being used, the location, and environmental factors. Therefore, it is not possible to disclose the effects of every possible treatment within the 4.3 million acre action area. Delivery of herbicides to surface water via overland flow is dependent on a number of chemical and environmental factors. The effects of these factors on the delivery of herbicides to surface water are discussed below. Prior to any aerial application of herbicide, design criteria require that the Aerial Herbicide Application Coordination and Safety Implementation Plan (in the Proposed Action) is followed. This coordination would include site-specific analysis of the factors discussed below, in order to determine appropriate treatments that would minimize adverse effects.

- *Rate of herbicide application and area treated:* Following label recommendations would minimize the potential for mobilization of substantial amounts of herbicide during runoff.
- *Runoff characteristics:* The timing and magnitude of runoff may be the largest factor influencing delivery of herbicides to surface water via overland flow (McBroom et al. 2013). Because some herbicides degrade quickly, very little may be left by the time the first rainstorm occurs. Within the project area, rainstorms can be rare during mid-summer, but frequent during late summer.

- *Soil infiltration capacity:* Soil properties influence how runoff is generated. Soils with low infiltration capacity will have the highest potential for runoff and therefore, the highest potential to result in the transport of herbicides to waterbodies.
- *Herbicide properties:* Herbicide properties including soil persistence in the environment (half-life), absorption by the plant (sorption coefficient), solubility, and the amount of time until an herbicide is “weatherfast” on leaves and soil, influence the amount of herbicide that would be mobilized by overland flow. Herbicides such as aminopyralid, imazamox, chlorsulfuron, clopyralid, dicamba, metsulfuron-methyl, and picloram with low sorption coefficients and high solubility are most susceptible to transport by overland flow. Herbicide degradation occurs through microbial activity, water, and/or ultraviolet light, depending on the chemical. Herbicides such as 2,4-D amine and glyphosate degrade relatively quickly by microbial activity and are not likely to be mobilized during runoff unless a storm occurs immediately following application.
- *Amount of plant uptake of herbicide:* By nature, aerial herbicide application is not target-specific. In areas where invasive plants create dense ground cover, herbicide uptake is likely to be higher than in areas with sparse ground cover. Where uptake by plants is low, more herbicide would be residing on the soil surface and could potentially be mobilized by overland flow.
- *Proximity of application to surface water:* A longer flow path to a water body would result in greater potential for herbicide degradation, adsorption to soil particles and organic matter, and dilution prior to entering the water body.
- *Streamflow characteristics:* Low streamflow would result in higher concentrations of herbicide, whereas high streamflow would cause rapid dilution. A high ratio of treated area to contributing watershed drainage area would result in higher risk of water quality impacts. For example, a 100-acre treatment in a small upland watershed draining 2 square miles would have a much higher risk to water quality than the same treatment along the Salmon River, which drains 5,500 square miles.

Leaching of herbicides through the soil could potentially result in contamination of surface water or groundwater. Movement of an herbicide can be described in terms of the relationship between the sorption coefficient and the half-life (Vogue et al. 1994). Highly soluble herbicides, resistant to biotic and abiotic degradation (e.g., picloram) readily leach through the soil. Other herbicides, while highly soluble, bind well with organic matter in soils (e.g., 2,4-D amine and glyphosate), and therefore, are not readily leached. Herbicides leached through the soil may contact subsurface flows. Some herbicide would be lost to chemical breakdown and metabolism by plants and other organisms, and some would be filtered out as it percolates through the soil.

The design criteria and BMPs address several important factors affecting herbicide movement through overland flow or leaching. Application of certain herbicides is limited, both in the distance from streams and the number of applications. Only ground-based spot spraying would occur in riparian areas, and directional application techniques would be used to direct herbicide away from water. Applicators will select the most suitable herbicide and adjuvant (as appropriate) combination for the setting and apply the lowest effective use rates. There will be no storing or mixing of herbicides within 100 feet of any live water or over shallow groundwater.

Applicators are required to obtain a weather forecast for the area prior to initiating a spraying project to try and prevent any precipitation or wind event occurrence during or immediately after spraying. Local weather conditions must be checked daily and site-specific conditions must be monitored during and after herbicide application. Live water (perennial streams, flowing intermittent streams, lakes, ponds, springs, and wetlands) will have a 300 foot no application buffer for all aerial application. Implementation of the design criteria and BMPs is mandatory and will minimize water contamination with herbicides.

The Service expects that herbicide reaching surface water or groundwater through overland flow and leaching following aerial and ground-based broadcast spraying would occur infrequently, be of short duration, and be small amounts as long as there is no precipitation event during or after application. However, a unpredicted rain event within 24 hours may increase herbicide in bull trout 100 foot buffers by this pathway, combining herbicide directly applied in 100 foot buffers with herbicide applied in adjacent upland areas. The combination of herbicide in 100 foot buffers increases the likelihood and toxicity of herbicide reaching bull trout waters, resulting in adverse effects to bull trout and designated critical habitat PBF 3 (food base) and 8 (water quality).

Water Contamination by Spills and Leakage

Most of the herbicides in the proposed action will be applied in a liquid solution, which requires transferring liquids from one container to another and occasional mixing of different chemicals in the field. Liquids are prone to spills through leaky spray equipment or containers and when mixing or transferring chemicals from one container to another. In general, minor amounts of herbicide leakage are likely to occur throughout the spray season from dripping while using spray equipment, but this type of leakage would occur at concentrations far below the target application rate.

Chemical contamination of water involving larger amounts of herbicides from spilled or leaking containers is likely to be an uncommon event because a significant leak or spill (exceeding the application rate) must occur and the spilled chemicals must reach the water. The likelihood of a significant spill is difficult to predict, but is constrained by design criteria and BMPs that limit the amounts of chemicals that are transported at any given time (i.e., herbicides transported for daily use will be limited by container size and the amount of herbicide anticipated to be used on any given day). Spilled chemicals reaching water is restricted by the storage and mixing of chemicals in locations where a spill would be too distant from water to reach it before clean up would occur (i.e., no herbicide storage, mixing, or post-application cleaning would be authorized within 100 feet of any live waters or over shallow groundwater areas; mixing and loading operations must take place in an area where an accidental spill would not contaminate a stream or body of water before it could be contained). Consequently, spills and leakage from handling are expected to result in discountable effects to bull trout and its designated critical habitat.

There is no practical way to transport chemicals in the field without crossing bridges or using roads or trails in close proximity to streams; consequently, transportation-related spills cannot be prevented. Although the likelihood of accidents is unknown, the risks from any spill that occurs is limited by several factors: all herbicides must be transported in U.S. Department of Transportation approved containers, which are likely to withstand minor accidents without spillage; the amount of chemicals handled at any given time are limited by provisions of the

proposed action; the applicator being familiar with and carrying an Herbicide Emergency Spill Plan (Proposed Action, Appendix D); having a spill cleanup kit available whenever herbicides are transported; and mixing and chemical transfers must take place in a location where the chemicals can be contained before they can directly enter the water. As a result of these factors, direct water contamination from a spill is unlikely to occur from mixing or transferring chemicals. However, if a spill occurred from a transportation accident that exceeds the application rate and may impact bull trout, it would be outside the scope of this consultation and the Forests would need to complete emergency consultation.

6. Summary of the Effects from the Proposed Action

Within the 4.3 million acre action area, there are approximately 157,000 acres of inventoried invasive plant infestations on 25,981 known locations. About 61,689 acres of infestations are mapped within RCAs and of these, 49,379 acres are in 5th field HUC's containing bull trout. Watersheds that have the greatest proportion of infested acres within bull trout habitat include the Lower North Fork Boise River (19%), Crooked River (17%), Middle North Fork Boise (12%), Skeleton Creek-South Fork Boise (12%), and Alder Creek-South Fork Payette River (11%). The Forests indicate that invasive plant infestations are a negative factor influencing watershed conditions in these areas. The Assessment does not include information that suggests that the frequency, duration, severity, or scale of potential sedimentation or water quality impacts caused by the Project are likely to be widespread on bull trout.

Rehabilitation and restoration activities would have the most extensive direct ground disturbances associated with the Project. Sedimentation effects to bull trout and its habitat from these activities are likely to be widely dispersed, and of low severity. Control measures for the proposed action include mechanical and manual control, biological control, and herbicide control. Sedimentation effects to bull trout and its habitat from mechanical and manual control are expected to be highly localized, widely dispersed, and of low severity. No adverse effects to bull trout and critical habitat are expected from biological control.

Potential adverse effects from herbicide control (including sedimentation and water quality effects) are expected to be infrequent, widely dispersed, of short duration, and low severity. Buffers on bull trout streams play an important role in preventing herbicide from reaching bull trout waters by limiting herbicide broadcast spraying to upland areas. A rain event has the potential to carry herbicide into bull trout buffer zones by mobilizing herbicide in upland ephemeral streams and through overland flow. In the event of an unexpected rain event, these pathways may increase herbicide in bull trout buffer zones by combining herbicide applied in upland areas with herbicide directly applied in these buffer zones. The combination of herbicide in the buffer zone increases the likelihood of herbicide reaching bull trout waters with enough toxicity to adversely affect bull trout and designated critical habitat. In the long term, the proposed action is likely to improve watershed conditions by controlling or eliminating invasive plant infestations on the Forests, which is likely to benefit bull trout.

The Service finds the potential for adverse effects to bull trout from the proposed action may be detectable at individual sites in bull trout-occupied streams; however, it is unlikely that these potential effects would be discernable at a local population scale or at the scale of any of the 10

core areas within the action area because the effects would be infrequent, localized, and widely dispersed across the core areas.

B. Effects of Interrelated or Interdependent Actions

The implementing regulations for section 7 define interrelated actions as those that are a part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. No interrelated or interdependent actions have been identified in this consultation.

VI. CUMULATIVE EFFECTS

The implementing regulations for section 7 define cumulative effects to include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. No cumulative effects have been identified in this consultation.

VII. CONCLUSION

A. Bull Trout

After reviewing the current status of the bull trout, the environmental baseline for the action area, the effects of the proposed action, and any cumulative effects, it is the Service's biological opinion that the Forests' proposed implementation of an adaptive integrated Project on Forest lands is not likely to jeopardize the coterminous U.S. population of the bull trout. The Service's rationale for this determination is presented below.

Implementation of the Forests' Project near streams and riparian areas occupied by bull trout could result in impacts to water quality of bull trout habitat through the introduction of chemicals. Potential impacts from the proposed action are not likely to occur evenly across the Forests due to the extent of the action area, the distribution of invasive plant infestations within the 10 bull trout 4th field HUCs, and only a portion of the invasive plant-infested areas are near streams and riparian areas. Potential effects of disturbance and sedimentation resulting from rehabilitation and restoration treatments, or control and management treatments that result in areas of bare soil, would be infrequent, localized, short-term, and of low severity and are not expected to reach a level where take would occur. As described above in the *Effects of the Proposed Action* section, chemical concentrations causing direct mortality to bull trout are unlikely to occur as a result of this action because of the limited amount of chemicals proposed for use in any treatment area. However, water contamination as a result of surface runoff or leaching should a heavy precipitation event occur following herbicide application in both upland and adjacent bull trout buffer zones could cause delayed mortality or sublethal effects to bull trout. Because potential effects are expected to be infrequent, dispersed across a large geographic area covering 10 bull trout core areas, and not concentrated in any one bull trout local population, the Service finds the level of impact is unlikely to appreciably reduce the viability of bull trout populations in the action area.

For the above reasons, the Service concludes that the anticipated level of effects caused by the proposed Project to bull trout and its habitat over the term of the proposed action, taking into account the environmental baseline and cumulative effects in the action area, is likely to be compatible with sustaining the viability of the 10 bull trout core areas, and the local populations of the bull trout within those core areas. Habitat quality and quantity for the bull trout on the Forests are likely to be maintained or improved under the proposed action because of the expected low severity of adverse effects to habitat, and the likelihood that invasive plant control will improve watershed conditions in the action area.

B. Designated Critical Habitat

After reviewing the current status of the designated critical habitat for bull trout, the environmental baseline for the action area, the effects of the proposed action, and any cumulative effects, it is the Service's biological opinion that the Forests' proposed implementation of the Project on Forest lands is not likely to result in destruction or adverse modification of designated critical habitat for bull trout. The Service's rationale is presented below.

The proposed Project covers 4.3 million acres of lands administered by the Forests. Due to the vast geographic area covered under the proposed action, and the distribution of invasive plant infestations, activities will not be concentrated near streams and riparian areas. The Service anticipates baseline habitat conditions for bull trout would be maintained or improved over the term of the action. The Service anticipates minor reductions in PBF 3 (food base) and PBF 8 (water quality) due to water contamination caused by surface runoff or leaching should an unexpected precipitation event occur following herbicide application. Potential effects are expected to be limited in size and duration, localized, and not occur evenly across the action area.

The Service concludes that the level of adverse effects to bull trout critical habitat in the action area is not likely to cause a further degradation of those physical or biological features in streams where they are below objectives, and some improvement in habitat conditions is expected to result from implementation of the proposed action. The affected critical habitat would be likely to maintain its capability to support bull trout and to serve its intended conservation role for the species. If the adverse effects of the proposed action are not substantial within the action area, then they are unlikely to be discernible at the designated critical habitat rangewide scale.

VIII. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood

of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.

Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement. The measures described below are non-discretionary, and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply.

A. Amount or Extent of Take Anticipated

Based on the results presented in the *Effects of the Proposed Action* analysis above, the Service finds that incidental take of the bull trout is likely to occur in the form of harm caused by sublethal effects of herbicide exposure.

Because the proposed action applies to a broad geographic area (approximately 4.3 million acres) and specific information on the locations of each invasive plant-infested area, timing and type of all proposed treatments, site-specific features affecting herbicide transport and handling, and presence or absence of bull trout in each stream reach is not available, the Service is unable to estimate a specific amount of incidental take. As discussed in the *Effects of the Proposed Action* section above, although the Service finds that take would occur infrequently, and be widely distributed across the 10 bull trout core areas, the potential for take cannot be eliminated. Because the available information is insufficient for the Service to quantify the amount of take anticipated, we describe the expected extent of take as the “applied acreage” treated with herbicide within 100 feet (buffer zone) of bull trout waters.

The Service does not expect herbicide application within 100 feet bull trout buffers to result in take of bull trout, but the unintentional addition of herbicide within 100 foot buffers as a result of a unanticipated rain event within 24 hours of herbicide application has the greatest potential introduction of herbicide into water. The array of mandatory design criteria and BMPs that would be implemented as part of the proposed action greatly reduces the potential for take of bull trout. Consequently, the Service anticipates the total amount of take will be low over the 15-year term of the action.

Based on the Forests’ needs and capabilities to control noxious and invasive plants, the extent of incidental take is limited to no more than 78 applied acres per year of herbicide application within 100 feet of bull trout waters for the Boise NF and 39 applied acres per year of herbicide application within 100 feet of bull trout waters for the Sawtooth NF. If either Forest treats more than the identified extent of incidental take in any given year, the extent of take is exceeded and reinitiation of consultation is required. Further, because the analysis of effects anticipates sublethal effects of herbicide or potential delayed mortality, but no direct mortality, reinitiation of consultation is required should direct mortality of any bull trout result from implementation of the proposed action.

B. Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to jeopardize the coterminous United States population of the bull trout.

C. Reasonable and Prudent Measures

The Service finds that compliance with the proposed Project, including full implementation of program design criteria, as outlined in the Assessment and Proposed Action, is essential to minimizing the impacts of incidental take of the bull trout on the Forests.

The Service also finds that the following Reasonable and Prudent Measures are necessary and appropriate to minimize the impacts of incidental take of the bull trout reasonably certain to be caused by the proposed action.

Reasonable and Prudent Measure 1 – The Forests shall minimize the potential for harm to bull trout from herbicide application.

Reasonable and Prudent Measure 2 – The Forests shall report on the number of applied acres treated annually within 100 feet of bull trout waters.

Reasonable and Prudent Measure 3 – The Forests shall report on herbicide spills covered under this consultation within 100 feet of bull trout occupied streams and designated critical habitat.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Forests must comply with the following terms and conditions which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are not discretionary.

Term and Condition 1 to implement Reasonable and Prudent Measure 1:

The Forests shall determine where invasive plant infestations occur within 100 feet of bull trout occupied streams and require applicators to use the least toxic suitable herbicides and adjuvants possible in those areas.

Term and Condition 2 to implement Reasonable and Prudent Measure 1:

The Forests shall ensure all chemical storage, chemical mixing, and post-application equipment cleaning is completed in such a manner as to prevent contamination of any riparian area, perennial or intermittent waterway, unprotected ephemeral waterway, or wetland occupied by bull trout or designated critical habitat.

Term and Condition 1 to implement Reasonable and Prudent Measure 2:

The Forests shall conduct reporting of incidental take as follows. By April 1 of each year for the term of the proposed action, the Forests shall report to the Service the actual number of applied acres treated within 100 feet of bull trout water, the application method, the chemicals used (herbicide formulations, adjuvants, and surfactant), and location of treatment sites. The report shall be submitted to the Field Office Lead of the Service's Eastern Idaho Field Office in Chubbuck, Idaho.

Term and Condition 1 to implement Reasonable and Prudent Measure 3:

The Forests shall conduct reporting of accidental spills as follows. By April 1 of each year for the term of the proposed action, the Forests shall report to the Service the number and severity of spills within 100 feet of bull trout water, the emergency response taken, the chemicals spilled (herbicide formulations, adjuvants, and surfactant), and locations of spills. The report shall be submitted to the Field Office Lead of the Service's Eastern Idaho Field Office in Chubbuck, Idaho.

IX. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery programs, or to develop new information on listed species.

The Service recommends that the Forest avoid applying herbicides or conducting restoration activities after August 15 within 20 feet of stream reaches supporting bull trout spawning to minimize disruption of spawning behavior.

X. REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the Forests' proposal to implement the Project within Forest lands managed by the Sawtooth NF and non-wilderness Forest lands managed by the Boise NF in Idaho and Utah. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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